The Journal

OF THE

AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

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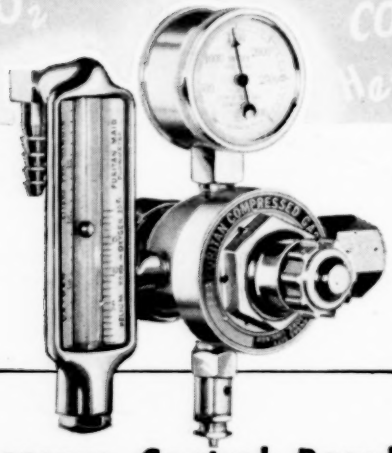

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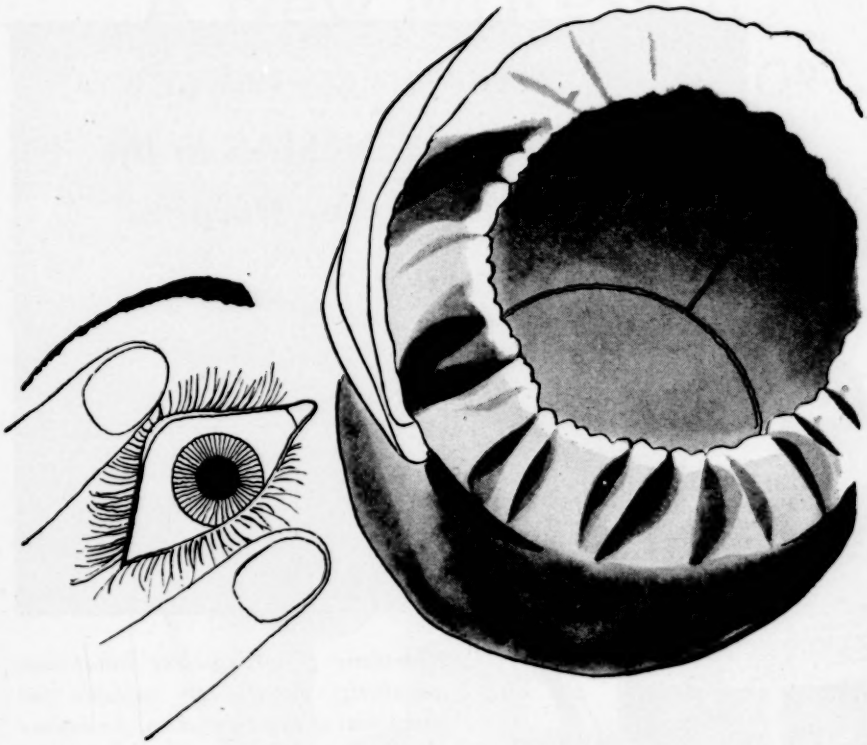

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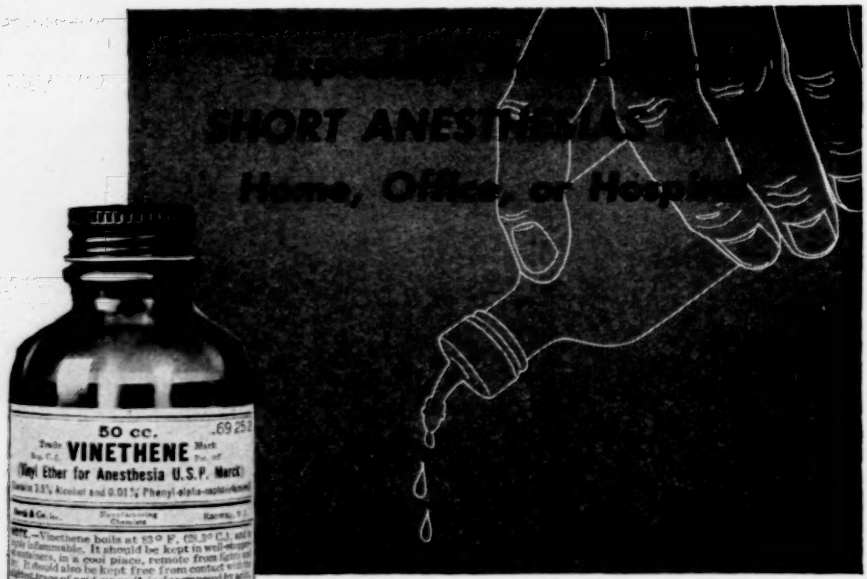

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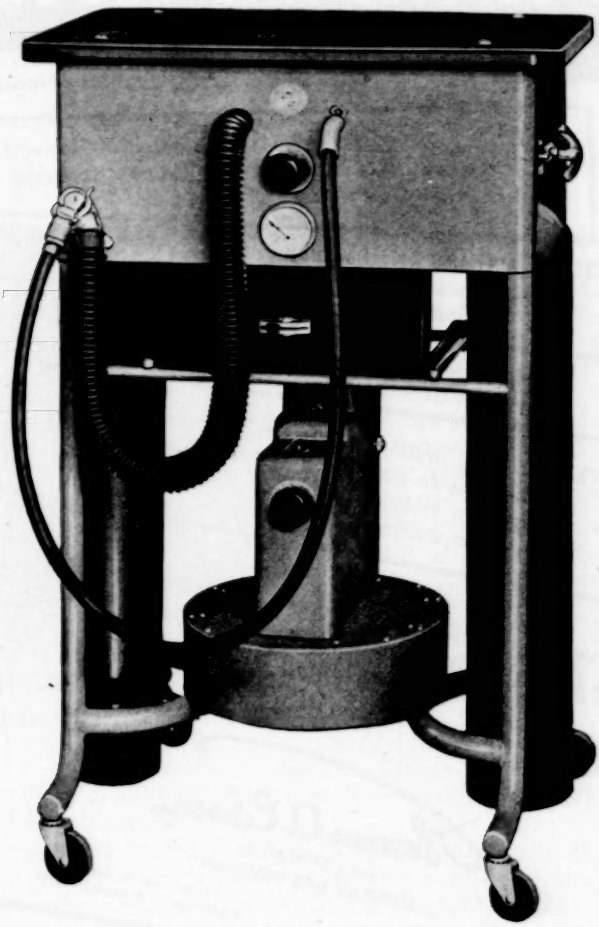

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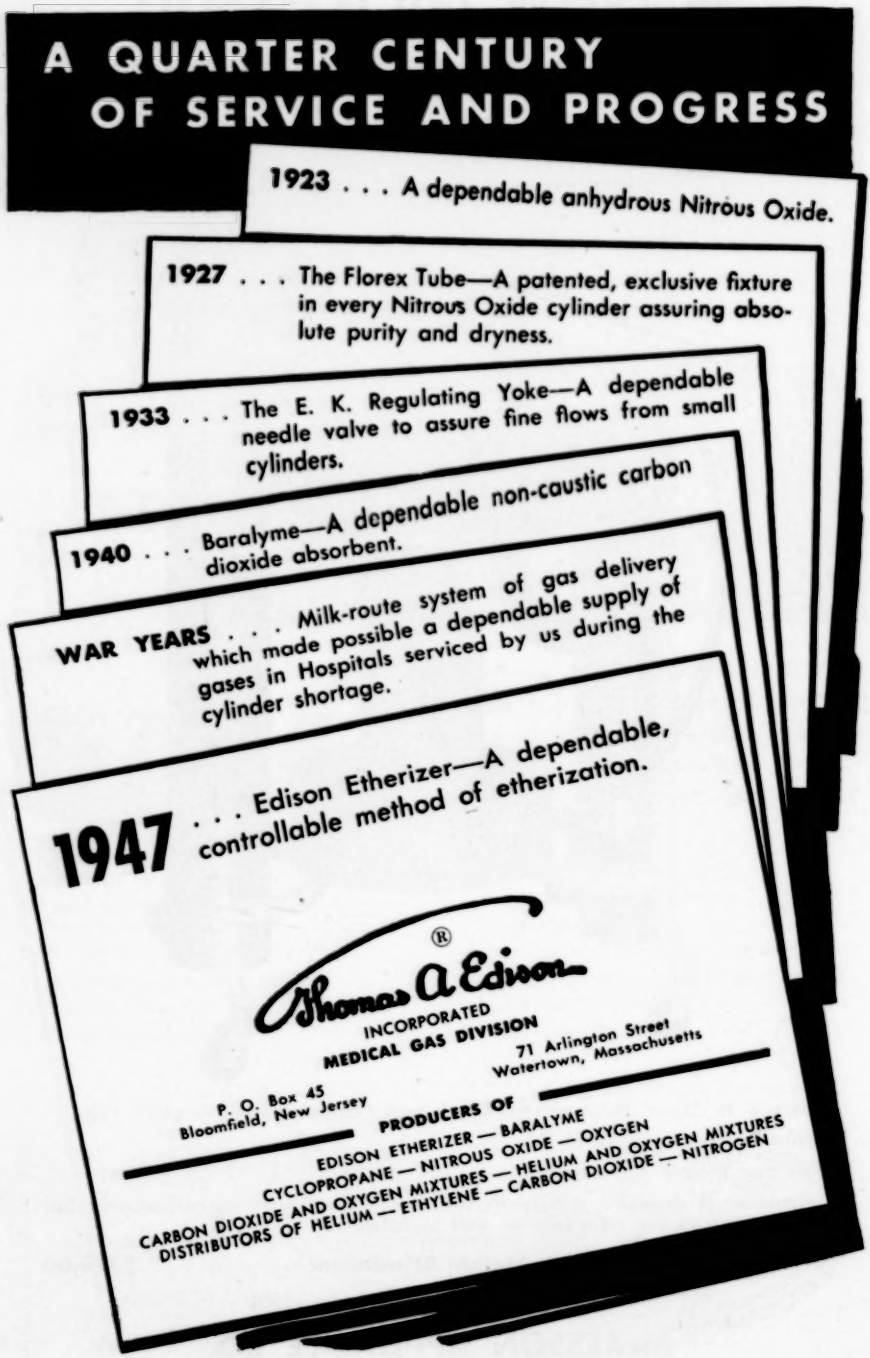
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The Journal of the American Association of Nurse Anesthetists

VOLUME XVI FEBRUARY, 1948 NUMBER ONE

Florence A. McQuillen Appointed Executive Director

Florence A. McQuillen

Florence A. McQuillen, staff anesthetist and instructor of anesthesia at the Mayo Clinic, Rochester, Minn., has been appointed Executive Director of the American Association of Nurse Anesthetists. She will assume the office on March 1, 1948.

A native of Matawan, Minn., and for many years a resident of Aberdeen, S. Dak., Miss McQuillen was graduated from the University of Minnesota School of Nursing and had special training in anesthesia at the Minneapolis General Hospital. She joined the anesthesia staff at the Mayo Clinic in 1927. Since 1935, when *Anesthesia Abstracts* was first compiled by the Journal Club of the Mayo Clinic, she has been associated with Dr. John S. Lundy in the selecting and abstracting of the articles for publication.

Miss McQuillen joined the A.A.N.A. in 1940. Since that time she has been active in the work of the state and national Associations and has been a popular speaker at national and regional meetings. She has served on the Publications and Public Relations Committees, and for the past year has been an Associate Editor of the JOURNAL and has conducted the section of book reviews.

The Board of Trustees believes that the Association is particularly fortunate in securing the services of one of its own members for the office of Executive Director. With the growth of the Association, it has been evident that a pressing need for a more efficient co-ordination of activities demanded a change in the method of handling Association affairs in the Executive Office, and an Executive Director with the professional background of an anesthetist. The Board believes that Miss McQuillen will be able to give more efficient attention to both state and national affairs than has heretofore been possible.

— Lucy E. Richards
Chairman of the Board

Nursing Organization

The Committee on the Structure of National Nursing Organizations is not an organization with authority to act for nurses or nursing without the consent of the participating organizations.

The structure study began nearly nine years ago (January, 1939) when the Board of Directors of the ANA, in response to a recommendation from a state nurses' association, voted that a special committee be appointed to consider the possibility of consolidating the three major national nursing organizations (the National League of Nursing Education, the National Organization for Public Health Nursing, and the American Nurses' Association) in order to ascertain how they might function in a more uniform way. Because the national emergency interfered with the study, the next definite action was not taken until January, 1944, when the individual boards of the three major organizations voted to undertake a joint survey and invited the National Association of Colored Graduate Nurses, the Associated Collegiate Schools of Nursing, and the American Association of Industrial Nurses—the only member whose status would be comparable with the possible status of the American Association of Nurse Anesthetists—to join with them in the study.

A request to participate in the structure study would entail no absolute necessity to accept a place in the final structure. However, participation gives the members an opportunity to hear and be heard at the committee meetings on matters affecting the future of the nursing profession.

To finance the structure study, each organization is assessed about $0.15 per enrolled member.

Until the November meeting of the committee in New York, the ANA representatives were restricted to the position of auditors. Now that fuller participation by the ANA is assured, the nursing profession promises to solve its own structural problem early enough to preclude its being taken over by unions, the medical profession, or other willing, but uninformed, groups.—Edith A. Aynes

A Time For Appraisal

This is a time of turmoil in politics, economics, and ideologies. It is not surprising, therefore, that uncertainty and confusion should exist in professional fields. It is not even surprising that ethical standards should be compromised by individuals who put themselves before their profession.[1,2] However, because another compromises ethical standards, are we as nurse anesthetists willing to do likewise?

As a profession has character only of the same quality as that of its members, the time is ripe for the individual members of professions to take personal inventory. For nurse anesthetists, a re-reading of the expressions of high purpose of Florence Nightingale and other pioneers in nursing should re-create the pride and the courage to reject the call of opportunism and impulses to react to insidious propaganda.

Within the already existing structure of the American Association of Nurse Anesthetists there exists machinery which, if set in motion by the members, can help to compromise differences. The same machinery should never be used to compromise principles.

1. The New Yorker, Oct. 25; Nov. 1; Nov. 8, 1947.
2. Unknown men in white. This Week, Nov. 23, 1947.

STRENGTH THROUGH CO-OPERATION

Louise Knapp, R. N.*
St. Louis

Many anesthetists must concentrate during their working hours on their responsibility for the patient and their relationships with the surgeon. Yet, in order to render effective service, it is necessary at times to consider thoughtfully your responsibilities to and relationships with other nurses and the public.

Many of you may be aware of the recent study of the structure of the six national nursing organizations made with a view to bringing them together into some unified group. Unification would give many added advantages when we wish to speak for what nurses want or what nurses are capable of doing. Unification would also assist in building the prestige of nursing so that we could attract the finest type of applicants to our field.

Each one of us can help with the plans leading to a unified structure of the nursing organizations, for in the democratic process organizations exist to help the individual reach desirable goals.

Recent meetings held in several states and also the meeting of the House of Delegates of the American Nurses' Association in September indicate that throughout this country there is a great desire for unity among nurses. Just to refresh your memory, at this time we have, in addition to your own American Association of Nurse Anesthetists, the American Nurses' Association, the National League of Nursing Education, the National Organization for Public Health Nursing, the National Association of Colored Graduate Nurses, the American Association of Industrial Nurses, and the Association of Collegiate Schools of Nursing.

Perhaps these names are a little confusing to you. If so, you can imagine how confusing it was during the war years to government officials who were eager to plan for recruiting nurses for the Armed Services or for recruiting students for schools of nursing. When they turned to the nursing profession they found that they would have to deal with many different groups which had conflicting ideas. This is always confusing to lay persons: they want to go to one "head" and get one answer; they don't want to get six different answers about the best way to carry out a plan.

In an effort to provide more effective machinery, the various national nursing organizations decided to set up the Joint Committee on the Structure of National Nursing Organizations. This committee had representa-

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Read before the Fourteenth Annual Meeting of the American Association of Nurse Anesthetists, St. Louis, Sept. 25, 1947.
*Director, School of Nursing, Washington University, St. Louis.

tives of the six national nursing groups and was asked to study ways in which the varying interests could be co-ordinated and yet provide for the diversity of interest which has been responsible for the development of the separate organizations.

One recognized fact in the normal development of an individual is that, as a baby, he progresses through a period of highly accentuated individualism. The two-year-old child doesn't think of the world around him; he thinks of himself. He doesn't want you to do things for him; he wants to do them for himself. He wants to stand on his own feet. Most of the fights that a child has with teachers, parents, and companions are traceable to the fact that he is trying to prove to everyone with whom he comes in contact that he is an individual and can stand alone. When the youngster reaches school, he begins to realize that he can't stand alone. He begins to enjoy being a member of a group.

Nursing organizations have followed in their development some of these same steps. Today it is realized that there is safety in numbers and that there is strength in numbers, and that we make progress through groups and professional organizations.

Because new fields of nursing have developed, new organizations have been started to deal with special problems. As time goes on, organizations overlap in areas of their activities. It is believed that through unified organization, many problems could be solved more easily and quickly, particularly those problems which concern many nurses.

Many people believe that, if we could build up the prestige of the nurse, it will be easier to secure enough nurses. Lay persons would be more impressed by the value of nursing if the facts they received would picture various types of nursing, rather than one small group.

An important fact about any new organization of nurses is that it must make provision for special interests—surgery, pediatrics, public health, industrial nursing, and anesthesia. Within the organization there must be freedom for the development of the interests of special groups which now exist, or for interests which may develop in the future.

It has been recognized that the graduate nurse in a responsible position needs more than a three-year basic course in nursing. Therefore, some means is needed for suggesting levels of specialization comparable with the College of Surgeons or College of Physicians in the medical profession. In the proposed plan brought before the six nursing organizations the Academy of Nursing was included. This would provide for the establishment and recognition of advanced programs and would also suggest levels at which nurses might function in various specializations.

The first step in co-operation is to study your own aims and program, and then to discover like interests in other groups. As a person primarily interested in the education of nurses as well as in nursing care for patients, I have selected some experiences that parallel or overlap some interests of nurse anesthetists.

A big problem in schools of nursing today is the recruitment of student nurses. We look for certain qualifications which we believe will enable the individual who enters the school of nursing to travel through the three-year program successfully and to function as a graduate nurse.

Personally, I believe it would be enormously helpful to directors of schools of nursing if they knew from your group what qualifications you consider essential in anesthesia, since some graduate nurses will want to enter that field. These special qualifications might be kept in mind when applicants are interviewed for the school of nursing.

In the School of Nursing of Washington University, the applicants must meet entrance requirements for the University. If they do that and their recommendation is satisfactory, they can come and spend three days at the school of nursing. During that time they have written psychological tests and interviews with three of us on the faculty of the school of nursing and with a doctor in the Department of Neuropsychiatry. In addition, we get opinions about the applicants from the Social Director, e.g., about their reactions to other students and their ability to keep punctually the various appointments that are crowded into the day. On the basis of these facts, we select the student. However, among the reasons for admitting a student is that she seems to be a pleasant person interested in other people, has accomplished something on her own before she presents herself for admission, and is pleasant and attractive. Hence I must recognize the fact that she may get married before she has been out of the school very long.

Therefore, the question that sometimes arises is: Should I pick faintly disagreeable, rather unattractive looking students who will not appeal to the doctors and the dental students? Would that be a better way of building up the profession? In other words, what is my aim in running a school of nursing?

If you have attended meetings of the hospital administrators you know that they believe a principal aim of the school of nursing is to staff the hospital with adequate numbers of nurses. What are the other aims of the school of nursing? What do you expect in anesthesia?

Often the nurse who gets her biggest kick out of taking care of a desperately ill patient may not be the person who is interested in the technics of administering anesthetics. Are there criteria by which you can tell the kind of person who is potentially interested in your field of specialization, and can you so inform the schools of nursing so that they could help you get the right kind of nurses?

Intelligence, knowledge, and skills must all be considered in selecting candidates, but the attitudes of the individuals are also very important. A person who is dissatisfied and hypercritical and disloyal can alter or ruin the attitude of the group. Therefore, it is important to get persons who are co-operative from the start, because the struggles with some of the others would be out of all proportion to the net achievement.

During her experience in the school of nursing the student is familiarized with opportunities in the fields open to graduate nurses. At present little emphasis is placed on opportunities in the field of anesthesia. Maybe your field is overcrowded, and you are not interested in getting new people into it. On the other hand, the student, in her basic course, has experience in the care of medical patients, surgical patients, obstetric patients, and the new-born baby, as well as in psychiatry and in the out-patient department. Selected students also have experience in public health nursing. They get some information about industrial nursing. All of these experiences help a student to analyze her abilities and to choose her field as a graduate nurse.

If the field of anesthesia wants to attract recruits, is there something that could be included in our basic program which would give the students a better appreciation of what the field of anesthesia is, and what it takes to be successful in that field?

In many ways nursing has changed greatly in the last 25 years. One important change is in the attitude toward publicity. Twenty years ago nursing was something which was not advertised. You didn't tell the patient where you came from; you didn't talk to him. As a matter of fact, you didn't let him know anything about you. You were there to do the work; you weren't there to chat with the patient! If anyone asked you what went on in the hospital, you didn't tell him because that was confidential, or you did tell him in spite of the fact that it was confidential and then discovered that the information disturbed him.

What a change has taken place since 1940! We are eager to talk on the radio and to have pictures of student nurses on the front page of the feature section of the newspaper. Students help to sell bonds on the street, usher at civic functions, and attend Rotary Club luncheons. All of these devices help to get nursing before the public and keep it there all the time. That is quite a change as far as we are concerned. All of these methods help to recruit students.

We must not forget, however, that one of the most effective ways of recruiting students is through the effect of what happens day-in-and-day-out to every patient in the hospital. An applicant often comes to the school of nursing because six years ago a grandfather was sick and he "thought the nurses were very kind to him." Another applicant comes in because the doctor at home has told her that nursing is a fine career and that the students in the school are nice and it is a good place to get an education.

Some applicants come in because they are relatives of other students who have gone through the school. They come in because their mothers are graduate nurses who think that nursing can do a lot for an individual.

These facts are probably just as important in recruiting graduate nurses for the field of anesthesia as they are for recruiting student nurses. If you want to recruit nurses for your profession, your contacts in the operat-

ing room give you an excellent chance to explain the opportunities in anesthesia to students, because all student nurses in the school of nursing have experience in the operating room. How can you interpret your work to them? You can tell them that the work is interesting, but what do they learn from you when you are not talking? Do they get the impression that you are a very nice sort of person, that you get great enjoyment from your work, that it's fun to work with the kind of people you *do* work with day-in-and-day-out, and, therefore, that it is something which they would like to do?

In interviewing two applicants who entered a recent class, I was told that they had become interested in nursing while working as attendants in other hospitals. In both instances the applicant made this comment: "I wouldn't want to go into training in that school, however, because I didn't like the way they treated the patients." That is a bit of unconscious teaching.

We can announce on the radio that nursing is a proud profession, but the young woman of today looks to see how you really and truly get on, how you deal with problems. Most students today deliberately choose an experience which allows them a chance to keep on learning. Can you share with the young students some of your knowledge about anesthesia and make them eager to learn more? This would make anesthesia more attractive to them, for in selecting services and experience in the hospital unit students prefer places where those who are regularly stationed take a great interest in teaching them how to do better work.

After admitting students to the school of nursing, we observe their progress with a view to discovering why some students are unsuccessful, what contributes to failure, and whether those factors could be controlled if we knew more or if we did things in a different way.

Perhaps many of you had your training under what was called the *autocratic* idea. The chief purpose of the experience in the school of nursing seemed to be to make you feel like a worm from the start; then it was easier to manage you. You knew your place, and you weren't apt to get into anybody's hair from then on because everybody was a senior to you, and everybody knew more than you did!

At the present time, it is recognized that some students drop out because they are unhappy during the initial introductory experience. We have tried to find ways of making them feel more at home. Actually, the process of selection in Washington University School of Nursing helps to orient the student. During preentrance tests, she is here for three days, and when she enters the school of nursing, she feels more at home, and she knows the others who came in the same group to take tests. She doesn't feel quite so stupid when it is a question of getting from the nurses' residence to the cafeteria — and if you have ever taken the wrong turn and ended up at a blank wall, you know how stupid that can make you feel.

Another helpful development is that of having students or Big

Sisters take certain responsibilities for each student who enters. The Big Sister sees that the newcomer meets people, that she has her questions answered, that she gets comfortably located in her room, that she knows how to get to the cafeteria, that she knows how to find those little shops in the neighborhood where one can get rubber heels put on, or buy black stockings, snacks, and other things. It creates a much happier atmosphere.

I once asked one new student what she thought of those older students. She said, "They are all so friendly and so helpful." I said, "Why do you think they are?"

She thought for a minute, and she said, "Oh, I guess because the older students were nice to them when they come in."

In other words, if you are going to live in an atomic age and start chain reactions, how about having *pleasant* reactions instead of unpleasant ones handed down from one generation to another?

In discussing recruiting, quality is just as important as quantity. It means numbers and quality, and probably the emphasis should be on quality. If in a given course or in a given institution you need half a dozen or 10 persons for certain work, you have a better chance of getting exactly the ones you want if you have about three times that number to draw from. If you must have 10 persons and 9 present themselves, you take all 9 in an attempt to get the work done, but you cannot guarantee quality of performance unless the circumstances are quite unusual.

Today it is important to see that correct information is available about nursing. The National Nursing Organizations publish pamphlets that are attractively assembled and give information about nursing. A recent pamphlet distributed to high school girls in an attempt to interest them is "Nursing is a Grand Career!" This gives facts about admission requirements for the basic course and outlines what a school of nursing should offer to the student. Information is also included about opportunities for the graduate nurse. You might like to examine the pamphlet to see if it is up to date with regard to opportunities in your own area.

As I mentioned earlier, the basic course tries to give the fundamentals which will enable the nurse to choose her field of specialization on graduation and then enter that field for which her abilities and interests best qualify her. In other words, we want to get the round pegs in the round holes instead of in the square holes. We think that the happier the individual is in her choice of job, the better job she is going to do.

I don't know whether our experience in carrying out democratic ideas in educating nurses would be at all applicable to your field at the graduate level. We co-operate with the students in many situations. Although the faculty members have certain abilities, the students have certain ideas that are worth listening to. As our students rotate through the different clinical services, the head nurse and supervisor write a report on the progress of the student. On that

same report the student nurse can write her comments on the experience she has had. She is encouraged to write her suggestions for making the service more interesting to her, or for improving our methods. We have found that a number of those suggestions have been so valuable that we have used them in altering the pattern of the student experience.

For example, the students who went to maternity hospitals were divided into three groups. A third went to take care of mothers, a third to the delivery room floor, and a third to the nursery. At the end of the first and second months they were shifted so that each student had three months' experience in maternity nursing, but they didn't always have it in the same sequence. The comment of several students was that it was very disconcerting to have as the first assignment the care of the mother, because when the patient went into labor they didn't know what the signs of labor were and whether the doctor should be notified or not. Accordingly they asked to have their experience on the delivery room floor first. It wasn't possible to send everybody to the delivery room floor first because of the size of the group. However, the students are now taken to witness a delivery as part of their orientation to maternity care. We have found that a moving picture showing the birth of a normal baby is also valuable.

Nursing has much to gain by applying methods found successful in other fields. Instead of lecture courses, many subjects are now taught by having discussion periods in which all students participate as content or methods of the basic program change. Similar changes might be worked out in courses for graduate nurse if instructors in all types of programs had an organization through which they could pool their experience and work out better plans.

In planning any educational program, our philosophy is very important. Are we concerned solely with facts and skills, or is it important to help the individual to develop in such a way that she can become the right kind of leader? What does the nurse think of her responsibility toward the patient? What does she think of her obligation to participate in professional activities? How does she interpret her professional work to outside groups?

The six National Nursing Organizations can act more effectively in another important area: the improvement of working conditions for nurses. Today there is a deep interest in better hours, better salaries, retirement plans, and a clarification of the qualifications for the positions of head nurse, supervisor, and instructor. It is believed that better working conditions will help to attract more women to the field of nursing.

With respect to the prestige of nursing in the community, the modern trend toward having nurses take a more active part in public gatherings and to be represented in public and community projects is very wholesome. There are a lot of ways in which we can help to interpret nursing to the public. If you want evidences of our failure in interpreting nursing, you have

only to read some of the comments made in newspapers and magazines to realize how little people really know about the nurse's responsibility and her preparation.

At the beginning I said that one of the suggestions that grew out of this special study of the structure of the nursing organizations was to have an Academy of Nursing. In a sense, this group would determine the standards which schools of nursing would be expected to meet if their graduates were eligible to join this professional nursing organization. It would also set up standards for judging the advanced levels of education, i.e., the preparation and experience that graduate nurses need for special fields.

The Academy would also probably have some members called Diplomates who would be the first level graduates. The Fellows would be the individuals who, in certain ways, had achieved distinction beyond that and who had met whatever requirements were set by the nursing organizations and members themselves for such recognition.

Another suggestion that has grown out of the study has been variously received. Instead of having a national *nurses'* organization which would be concerned with problems facing nurses, we would have a *nursing* organization which would be concerned with problems facing nurses and also with the problem of providing adequate nursing care to everyone who needs it in this country. According to this suggestion, the nursing organization would include lay members.

Many nurses believe that lay members would weaken the professional status of nurses. Actually, at the present time, the National Organization for Public Health Nursing and the National League of Nursing Education both have lay as well as professional members. One member of both groups is Mrs. Frances Payne Bolton, the Representative in the Congress who presented the Bolton Act for the establishment of the Cadet Nurse Corps. She also gave a large endowment to Western Reserve University School of Nursing and financed the rating study in the middle '20's. It seems to me that nursing has been definitely strengthened by having as a lay member a person like Mrs. Bolton.

It has occurred to me that, if a group such as yours ever had lay members, it might be helpful to have a selected number of doctors interested in anesthesia on your Education Committee to help you work out plans for keeping your educational procedures up to date. Both the National Organization for Public Health Nursing and the National League of Nursing Education have lay members who are experts in other fields such as research or education. These individuals can help us to keep our professional standards on the same high level of those of allied professional fields.

If it is ever decided to have lay members in the nursing organization, those lay members could be required to meet any requirements that the professional group wished to enforce. It could be stated that not more than 2 per

cent of the total membership could ever be drawn from non-nurse members, and that only those who had demonstrated an interest in the problems of nursing would be eligible.

A recent development has been the belief of many educators in the field of nursing that student nurses should not be asked to pay for their own education when they enter a school of nursing, but that the government should pay something, give scholarships to students who could then use the scholarships in any school that they wished to enter. Strange to relate, the Members of Congress, when they were approached, seemed to be almost unanimously in favor of government support. However, when the question arose as to what kind of bill would be written and how it would be introduced, they discovered that all the nursing organizations differed among themselves, and therefore they could get no unanimous opinion. The Congress didn't want to undertake such a program unless all professional nurses would back it.

It seems, therefore, that co-operation would be helpful in a great many different directions. It is also apparent that many strictly professional nursing problems could be solved more satisfactorily with the aid of lay people.

Lay people can do certain things for us better than we can ourselves. Raising funds is one thing; supporting legislation is another. When the nurses in Michigan wanted to have the Nurse Practice Act changed, they enlisted the co-operation of committee members active in the Public Health Services in the rural areas as well as in the towns; those lay members went out and campaigned and got enough votes to see that the Nurse Practice Act was passed. One lay member who was interested because she served on the Child Welfare Committee said, "We must have better requirements and better standards for nurse licensure in Michigan," and she talked to her friends who were going to vote. It was much more effective than if the public health nurses had gone around and said, "We want to raise our standards; will you support us?" The public sometimes thinks we are only campaigning for higher wages for ourselves, and therefore they are a little skeptical of things we suggest. They are not so skeptical when the suggestion comes from citizens in the community.

SUMMARY

The present interest of many nurses seems to be toward one unified organization which will provide for the development of all specialties. It is believed that such an organization would achieve the expressed aims of nursing, i.e., better service for the public and protection of the professional interest of nurses, more effectively. It would also enable nurses to secure funds from the government as well as from foundations for special projects and studies. In addition, it would provide for recognition and added prestige for nurses who are well qualified and so might encourage more nurses to round out their experiences in preparation.

(*Continued on page* 44)

PERSONNEL RELATIONSHIPS

Frank R. Bradley, M.D.*
St. Louis

Personnel relationships have been the subject for frequent discussions during the last decade. Most of the discussion has been of a very general nature. It has been fuzzy around the edges, without specific ideas, and chiefly designed for administrators and department heads. Perhaps it could better be called employee relationships. I am not certain that the term personnel relations definitely applies to the subject that you wish me to discuss, or to my understanding of it. *Personal* relationships is perhaps a better term. Inasmuch as the nurse anesthetist works with other hospital personnel, and the administrative anesthetist also has her own department to consider, I leave it to the audience to make its own application of my presentation.

The art of working with other people, under whatever name, is of great importance to the nurse anesthetist today. The medical profession sees the success of the nurse anesthetist, and competition has emerged on the part of physicians as more and more doctors have taken up anesthesia as a career. Accordingly, you need to work intelligently on a functional plan of personal relationships with personnel working within the hospital, with allied professions, the doctors, the nurses, the hospital administrator, and with national organizations whose interest is in the hospital. In so doing, you will be better equipped to meet that competition.

A word about competition. There are many who are afraid of competition, but competition is a natural component of survival. If we are to hold our place, it may and must only be by dint of superior power, whether of wit, or arms, or position which we possess. Such is the law of life; such has it ever been; such it will ever be. That it is for all the prayers and tears that ask for its repeal. I wish to point out, however, that competition can take the form of co-operation. There must be co-operation, not only within the field of anesthesia and with medicine and the other sciences, but with the nursing profession.

Co-operation between experts in the attack on scientific problems in different scientific fields is good, but it occurs all to infrequently. For such co-operation to be effective, each of the co-operating services must have, or must secure, an understanding of the language, the problems, and the research methods of the

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*Director of Barnes Hospital; Past-President A.C.H.A.

others. This may mean a considerable outlay of time and effort, but the results are generally worth it.[1] Specific application of this principle may be made in your field. For example, the curriculum for the courses in anesthesia for nurses should be so arranged that the student is taught the language of medicine, of social service, of nursing service, and even business, public health, and medical care. How this is to be taught in a crowded year of training is a research problem which the directors of the schools of anesthesia for nurses must work out.

To obtain co-operation, you must go more than halfway. For you, as nurse anesthetists, to think that the allied professions will seek you out is immature. It does not require too much understanding of human psychology to realize that the other medical services are so engrossed in their own special fields that they are likely to take the nurse anesthetist for granted. Accordingly, it is necessary for your profession, deliberately and in a planned way, to see that the nursing profession is made aware of your existence and the necessary role that you play today in enabling the surgeon to carry on his profession. The directors of the schools of nursing should be approached with the definite thesis that the nurse anesthetist is still a nurse. On the basis of this proposition, one might consider the possibility that schools of anesthesia for nurses might well be part of nursing education on the graduate level. I believe that the idea is at least worth while exploring.

Your relationships with the physician, I believe, must be based upon the fact that you are nurses. That part of the Nightingale Pledge which states, "With loyalty will I endeavor to aid the physician in his work and devote myself to the welfare of those committed to my care," should be, in my opinion, your leading light. For the benefit of the patient, I believe that the operating surgeon should remain the one person solely responsible for the patient's welfare. I believe that even the medical anesthetist should not change or abrogate the surgeon's responsibility. We have all observed the tendency of the anesthetist to assume that it is her or his special problem to prescribe the anesthetic and the method of its administration. If my belief is correct, the anesthetist should be in a position to advise the surgeon which in the anesthetist's opinion is the best anesthetic, or the best method of its administration, but the final decision is the operating surgeon's. Even though many times the anesthetist may be the more competent to make the selection, it is her function to advise and suggest. Therefore, the problem is to so utilize the technics of personal relations that the operating surgeon is aware of your ability and has trust and confidence in that ability and, may I add, in you as a person. That requires a job of selling. When tact, discreet persuasion, and courtesy are used in presenting an idea to the surgeon, it does not bear the sting of instruction or command. This is no intent to belittle the

1. Huggins, M. L.: Cooperation between the sciences. Communication no. 934, from the Kodak Research Laboratories.

position of the nurse or the physician anesthetist. The safety of the patient requires that one person, and one person alone, be responsible. There is no other way to fix responsibility. Divided responsibility and authority are ill mated. My reason for emphasizing these matters is that much of the friction between the nurse anesthetist and the physician comes from a failure to observe certain technics of personal relations. By such observance, you may tactfully control the situation and leave the impression with the operating surgeon that he has made the decision, and that it is only fair that he should inasmuch as he will—in the event of disaster—take the ultimate blame.

The competitive activity of the medical anesthetist is adequately shown by the following quotation from an editorial:[2] "But recently public interest has been awakened and from time to time popular articles are appearing in lay magazines. The community is learning more about anesthesiology and the training of those who administer anesthetic agents. When authentic information has become more general there will not only be a sympathetic attitude, but there will also be public demand that anesthesia shall be entrusted only to physicians." The last four words, "*entrusted only to physicians,*" speak for themselves. I do not propose to speak about counter-propaganda, nor would I be competent to do so. However, I do believe I am competent to say that your relationship with the patients to whom you give anesthetics is a neglected field. How many of you visit your patient after he has recovered from his operation, not only to see how he fares, but also to let him know that you are interested in him as a person? In the absence of the element of competition, such interest is a necessary and vital part of the work of your profession, and certainly it is good personal and public relations. In the face of the present competition, it is invaluable!

With regard to good personal relations with the nursing profession, let us not forget the operating room nurse. Do you co-operate with her, or do you fight with her? Do you enlist the aid of your administrator and superintendent of nurses or the director of the school of nursing in promoting better personnel relations with the people with whom you work daily? Do you praise their work and observe such amenities as birthdays, anniversaries, engagements, and weddings; to any woman—or man, for that matter—these are items of consequence.

If there is a personnel director in your hospital, do you work in co-operation with her? One may say, "What does a person educated in that field know about anesthesia?" If the personnel director does not know about anesthesia and its personnel problems, you have an opportunity to go halfway and farther by giving the personnel director vital information about your profession.

Elton Mayo speaks of co-operation in his book, *The Social Problems of an Industrial Civilization.*

2. Dittrick, Howard: Anesthesiology and the public. Anesth. & Analg. **26** :176, July-Aug., 1947.

No doubt most of us agree with him that the central problem in the lack of understanding and co-operation between management and labor is social; that there should be some way of improving communications so that the individual has a greater ability to communicate his feelings and ideas to another and so that groups have an increased ability to communicate effectively and intimately with each other; and that co-operation is the most important factor in personnel relations programs now and in the immediate future. We believe that the department head is the keystone of the arch! The heads of departments of anesthesia are thoroughly trained professionally and technically and should be conversant with the ideals of medical and hospital service. Their policies must be communicated to the personnel who apply them. Communication should work both ways; the department head and supervisors must bridge the gap as repeater stations. If the department head is properly trained to talk with each individual employee, the relationship is analagous to a two-way telephone conversation in which facets of personalities are conveyed by shades of emphasis and pauses, and in which there is a recognition of need and intent beyond that conveyed by the spoken word. This does not mean that we should do away with written directives or precedents. They are, it is true, more like the telegraph in that the voice is not used and the ear does not come into play; the words are formal and stripped of the niceties that are wrapped up in the pauses for assent, and most of the talking is done at one end of the line—the head end. But they are most essential for a "fix," as it were, for the record, for the more technical functions, and, above all, for training personnel.

In the last analysis, be it personnel relations or personal relations, the better term is human relations. That is really our objective as practitioners of part of the great humanitarian profession of caring for the sick and injured. Good human relationship is derived chiefly from co-operation, i.e., harmony between the various fields, which makes for greater efficiency, greater service to the patient—that is, the public—and consequently higher standards of living.

SEVENTH QUALIFYING EXAMINATION FOR MEMBERSHIP

The seventh qualifying examination for membership in the A.A.N.A. will be held Apr. 26, 1948. In order that state registration of the candidates may be verified, transcripts and references obtained, and applications submitted to the Credentials Committee, applications must reach the Executive Office by Mar. 1. The hospitals at which the examinations will be conducted depend on the geographic location of the examinees and will be announced later.

POSTANESTHESIA OBSERVATION ROOM

Florence A. McQuillen, M.A.N.N.A.
Rochester, Minn.

The postanesthesia observation room at St. Mary's Hospital, Rochester, Minn., was established on March 17, 1942. The name was soon contracted to P.A.R., by which it will be called throughout this article. Since the problem of postanesthesia care is of great concern to the anesthetist, the room was arranged and is supervised by the staff of the Section on Anesthesiology of the Mayo Clinic.

The purposes of the postanesthesia observation room are: (1) to improve the care of the patient during the immediate postoperative period; (2) to make the special skill of the anesthesia staff available to the patient; (3) to concentrate the nursing care and thus lessen the duties of the floor nurses. Some of the many values of the system have become more apparent as it continues to be used. The patient, before leaving the operating room, is seen by a senior staff anesthetist. At that time the general condition of the patient, the depth of anesthesia, and the condition of the teeth and eyes and of the airway, as well as the presence or absence of any foreign body in the mouth, are checked. The patient receives better care in the P.A.R. than he would if he were in his own room. Other patients on the floors benefit from the arrangement because nurses are able to continue the care of those patients without being confined to the full-time care of the unconscious patient. The surgeon's assistant is relieved of the immediate care of his patient. When he has accompanied the patient to the P.A.R., he may quickly return to the operating room and be confident that his orders will be carried out and that any emergency will be handled by the anesthetists. Every patient has the benefit of having readily available any of the special equipment that may be needed during his recovery. It would be impossible to equip every room in the hospital with all of the devices for emergency use, such as laryngoscopes, intratracheal tubes, airways, suction apparatus, and resuscitators. Drugs, fluids, and equipment for their administration are kept ready for immediate use (fig. 1).

The P.A.R. is situated near the operating rooms. It has been estimated that there should be one bed in the room for each operating room. At St. Mary's Hospital, there are 12 operating rooms, and in the P.A.R. there are 15 beds. Each of the beds should be arranged so that it can be seen from any part of the room. Male and female patients

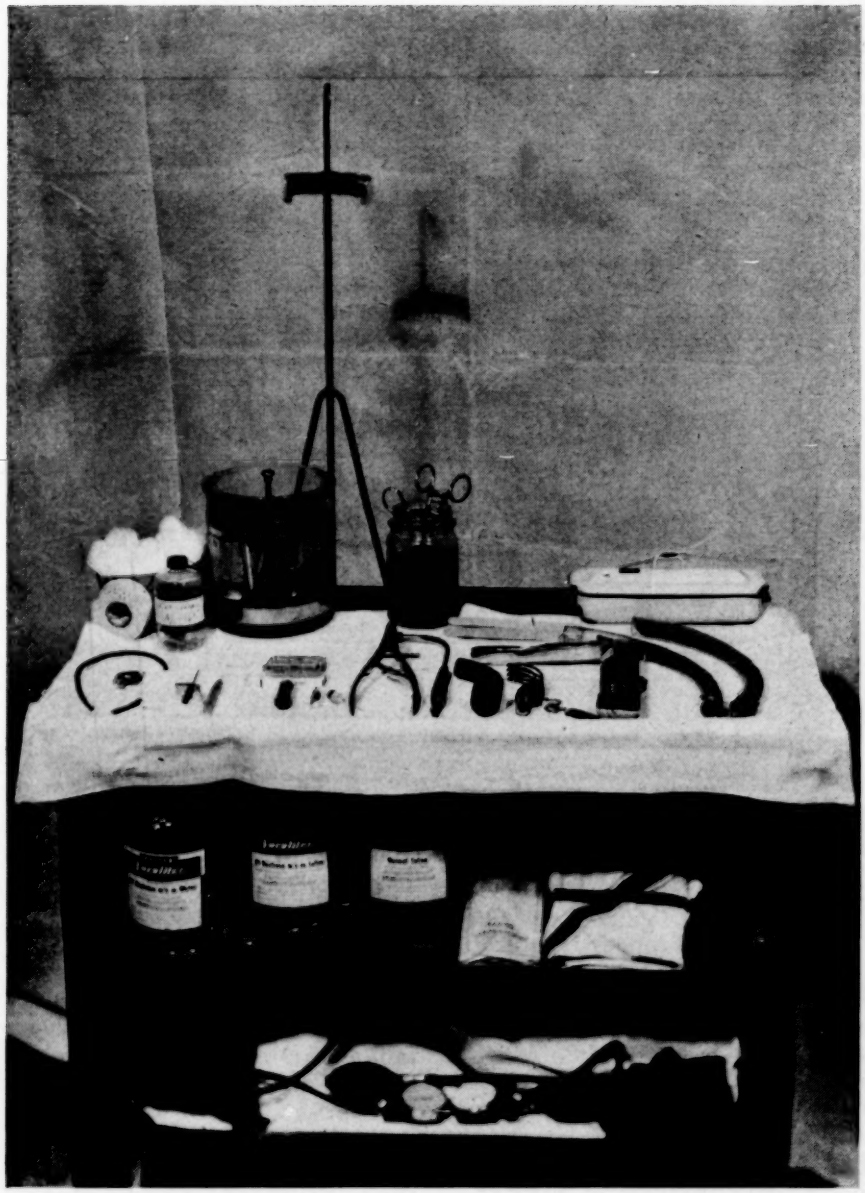

Fig. 1.—Table showing equipment kept ready for use in P. A. R.

are placed in the same room. Since the patients are returned to their own rooms before they are fully aware of their surroundings, there is no necessity for having separate wards for men and women.

the operating room may be useful in the P.A.R.

Some of the problems of the P.A.R. have been solved. The patient is placed with his head toward the foot of the bed (fig. 2). This saves many unneces-

Fig. 2.—View of one end of P. A. R. showing arrangement of beds and equipment.

The P.A.R. is opened at 8:00 A.M. and is closed at 5:00 P.M. Two graduate nurses and an orderly are in attendance. The room has two telephones to insure easy communication with the anesthesia room on the operating room floor. Physician anesthetists respond to calls for any special care the patient may require. Because of their familiarity with the problems of the unconscious patient, the nurse anesthetists who are not busy in

sary steps as the nurse walks from one patient to another. Sideboards are placed on each bed to prevent the patient from falling out of bed. Relatives of the patients are not permitted in the P.A.R. When a patient is sent there, the nurses on the floors are instructed to inform the relatives who may be waiting for him as to his whereabouts.

It has been estimated that the time which a patient spends in the P.A.R. is roughly equivalent

to the time he spent in the operating room. During his stay in the P.A.R., he receives fluids or any other medication or treatment which may have been ordered for him. When he has regained consciousness and his condition is satisfactory, he is taken to his room. A resumé of the treatment he has received is

The increasing use of curare in combination with anesthetic gases has decreased the number of patients who are sent to the P.A.R. When a patient recovering from a general anesthetic has low blood pressure or respiratory depression, or requires special attention for any other reason, he is sent to the P.A.R.

(39)

Name: No: Date: Surg:

Reason for P.A.R.:

Time arrival: Time departed:

Condition on arrival:

Treatment & course:

Condition on departure & remarks:

Lundy—Post Anesthesia Observation Room Record—1942

Fig. 3.—Record used in P. A. R.

sent to the floor with him. Special carts, which extend to the level of the bed instead of higher, as do carts used in the operating room, make the moving from and to the beds easier for the patient and for the P.A.R. personnel.

Not all patients who are operated upon are sent to the P.A.R. For instance, during one year more than 15,000 persons were operated on at St. Mary's Hospital, and only 4,329, approximately 29 per cent, were sent to the P.A.R. The decision to send the patient to the P.A.R. is made by a senior member of the anesthesia staff. When a patient is awake after general anesthesia and when his condition is satisfactory, he is sent to his own room.

After the use of local or spinal anesthesia, the patient does not require special care unless, of course, shock or other complicating factors alter the picture. When a patient has engaged a special nurse, he may be sent to his own room although he is unconscious. When additional care may be necessary, he is sent to the P.A.R., and his special nurse attends him there until such time as the need for extra care has passed. When a respirator or other elaborate apparatus is necessary in the postanesthesia period, the patient is sent to his own room, although he may be unconscious. The services of the anesthesia staff, when they are needed, are available to him there.

Records are kept for each patient who comes to the P.A.R. (fig. 3). On the reverse side of the record sheet, which does not contain any printing, details of the pulse rate, blood pressure, and respiration are recorded. In addition to this record, detailed daily records are kept of the hours, numbers of patients, treatments, and so forth. From these records information has been obtained which will give some idea of the amount of work which was concentrated in the P.A.R. during the first five years of its existence.

During the period from March 17, 1942, to March 17, 1947, 18,593 patients were cared for in the P.A.R. at St. Mary's Hospital. Each year the room was in use for an average of 295 days. More than 30 patients were cared for in a single day on several occasions. Each patient spent an average of 1 hour and 32 minutes in the P.A.R.; the time varied from a few minutes to 21 hours. In the latter instance, a special nurse stayed with the patient in the P.A.R. Although the actual hours on duty for the P.A.R. staff varied from day to day, over the five year period the average was seven hours a day, six days a week. The room is not open at night, on Sunday, or on holidays.

Records of all treatments have been kept for the five year period. During that time, fluids, other than blood, were administered intravenously more than 9,500 times. In addition to cases in which the intravenous administration of fluids was started in the P.A.R., there were 1,930 instances in which the administration was started in the operating room and continued in the P.A.R. Blood transfusions were started in the P.A.R. 488 times; 427 transfusions were completed in the P.A.R. after having been started in the operating room. These figures do not include the transfusions which were started and completed in the operating room. Some of the drugs which were given were insulin, hykinone, morphine, epinephrine, synkamine, and cortin. Carbon dioxide and oxygen as well as oxygen alone were administered a total of 85 hours during the five years. Hypodermoclysis was started 7,695 times.

The P.A.R. may be used for other purposes than actual postanesthesia observation. Patients who have undergone encephalography, for instance, may be kept in the P.A.R. while the encephalograms are being examined. Out-patients who may require observation or rest for a few hours before leaving the hospital may be sent to the P.A.R.

To evaluate the usefulness of the P.A.R. it would be necessary to transpose the statistics into actual performances. Not only the number of hours needed to attend the unconscious patients but also the time and number of persons required to bring equipment, to prepare hypodermic or intravenous apparatus, and to procure and set up suction apparatus would have to be taken into account. In addition to nursing duties, the time required and the distances covered to accomplish the many duties of the physicians in caring for the patients when they are allowed to recover in their own rooms, widely sep-

(*Continued on page 57*)

ANESTHESIA FOR THORACIC SURGERY

Edward J. McGrath, M.D., F.A.C.S.*
Cincinnati

There are certain advantages and corresponding disadvantages in discussing a subject with such current interest as anesthesia for thoracic surgery. The popularity of the subject can offset any reasonable inadequacy of the speaker. In the absence of the crystallizing effect of years of experience with many patients treated by large segments of the medical profession, adherence to any one of several conflicting viewpoints can be justified and sustained. Contrariwise, the medical literature is so full of the subject that it is well nigh impossible to offer anything new. Segments of any audience are also probably vehemently attached to definite opinions which do not necessarily coincide with those of the speaker. Consequently, one is constrained to speak cautiously, lest a future wider experience bring one's present commitments back to haunt him.

My viewpoint, therefore, must be understood for what it is. I am a surgeon, a thoracic surgeon, not an anesthetist. While I am acquainted with the literature on anesthesia, my familiarity with applied anesthesia is based upon its use for my patients in hands other than my own. My opinions, therefore, are based upon my patients' behavior as I work in the operative field and as I see them in bed postoperatively, rather than from the head of the operating table.

In singling out thoracic surgery for discussion, we imply that there are inherent factors associated with surgery of the thorax which distinguish it from surgery elsewhere in the body. That these factors are essentially quantitative rather than special in no way lessens their vital importance. In thoracic surgery, this quantitative differential is concerned specifically with cardiorespiratory adequacy. For didactic and academic purposes one can and does discuss the physiology of respiration and that of circulation as separate entities. Practically, particularly in relation to clinical surgery, these two functions of the body are so completely interdependent as to constitute a single unit. Adequate function of one is indispensable to adequate function of the other. The physiologic cycle of respiration begins at the oral and nasal orifices, extends to the individual body cell, and is completed at the oral and nasal orifices. Failure of the intervening mechanism at any point along the way spells disaster.

Read before the Ohio State Association of Nurse Anesthetists, Columbus, Ohio, April 9, 1947.

*From the Department of Surgery, College of Medicine of the University of Cincinnati, and the Cincinnati General Hospital.

As is true of other functional units in the human economy, vast resources of pulmonary and cardiac potential insure an adequate cardiorespiratory margin for all ordinary demands made upon the body. However, in order to rid the body of intrathoracic disease, the thoracic surgeon and his team deliberately reduce those reserves to a margin so small that the difference between life and death for the patient is a matter of per cents rather than multiples. Consequently, while there are a few problems unique to thoracic surgery as such, the immense importance of each detail of surgery within the thorax and of the anesthesia makes anesthesia for thoracic surgery practically a separate branch of the total field of anesthesia.

The physiology of respiration may be summarized very simply and briefly: Under the impetus of contraction of the musculature of the thorax and the diaphragm, oxygen is drawn through the pharynx, larynx, trachea, and bronchial tree into the pulmonary alveoli whence it enters the pulmonary capillaries, there to be taken up by the hemoglobin of the erythrocytes. These return to the left side of the heart and are pumped out into the general circulation, ultimately reaching the capillary bed where the oxyhemoglobin releases its oxygen to the individual body cells. Conversely, these cells deliver carbon dioxide, one of the end products of cell metabolism, to the blood plasma, which transports it, through the right heart, to the pulmonary capillaries. There it is released into the pulmonary alveoli and, under the impact of the relaxing thoracic musculature and diaphragm and the recoil of the lungs, is discharged through the bronchial tree, trachea, larynx, and pharynx to the exterior of the body.

Such a process needs numerous essentials for its efficient operation. The supply of oxygen from without must be adequate. There must be clear passage to the alveoli. The amount of hemoglobin available for adsorption of the oxygen must be adequate. The transport mechanism, the cardiovascular tree, must be adequate to its task. This requires, on the one hand, that the heart serve as an efficient pump and, on the other, that peripheral vascular tone be capable of maintaining a balanced distribution of blood, particularly to such critical points as the central nervous system, and of preventing splanchnic or peripheral pooling. Another component of the transport mechanism is the fluid medium in which the erythrocytes are conveyed; the blood volume must be adequate. At the periphery the physicochemical transmission of oxygen from hemoglobin to somatic cell must be accomplished as well as that of carbon dioxide from cell to plasma. The return of carbon dioxide to the lungs depends on the same transport mechanism, and the discharge of carbon dioxide to the exterior is accomplished by way of the same passages as the ingress of oxygen to the lungs. Finally, means must be available for the adequate discharge of carbon dioxide from the respiratory passages. This, simply, is the story of inhalation anesthesia.

Intrathoracic surgery, by its very nature, however, seriously impedes this process at several points. In addition, the very disease under surgical attack further complicates the problem in several ways. To begin with, opening the chest per se destroys the hermetic seal which ordinarily safeguards the bellows-like action of the thorax. Immediately, 50 per cent of the ventilating surface of the body is rendered physiologically useless. Moreover, due to mediastinal sag, there is still further encroachment upon the ventilative reserve. Fortunately, this sag is limited; in addition, the body is able, by reflexly increasing the respiratory effort of the intact hemithorax, to compensate for the loss of ventilating surface to an appreciable degree. A further compromising consequence of opening the chest with the collapse of one lung is the reduction to a single passage of the avenue of entrance for oxygen and exit for carbon dioxide. The importance, therefore, of keeping this passageway clear at all times cannot be overestimated.

Coincidentally with the reduction in ventilating surface, the normal action of the transport mechanism is disturbed when the thorax is opened. Primarily, the normal equalization of pressures about the heart is destroyed with the collapse of one lung. Again, the closing off of half of the pulmonary vascular bed imposes an unwonted burden on the right heart. Next, the mediastinal sag, coupled with the pressure derangement previously noted, seriously compromises cardiac efficiency. This is particularly apparent if and when cough occurs. The thin-walled venae cavae are deprived of the assistance of the normally negative intrathoracic pressure and tend to collapse, or even kink, if mediastinal excursion is great enough, as in a paroxysm of severe coughing. Finally, as a result not only of mediastinal sag or swing, but even more markedly of surgical manipulations, the external autonomic nervous system mechanism controlling cardiac action, upon which not only the rate and rhythm but also the vigor of cardiac impulse depend, is subjected to severe and prolonged insult.

In the light of the foregoing, the gravity of blood loss, from the standpoint of reduction in fluid blood volume as well as in oxygen-carrying capacity through decreased hemoglobin content, becomes only too apparent. In thoracic surgery, the blood loss incident to all major surgery is coupled with the further hazard of very great loss of blood in a very short time from injury to one of the great, thin-walled vessels of the thorax. In addition, the disturbances in cell metabolism associated with general anesthesia at all times are equally present in thoracic surgery, the total effect being magnified by all the other factors I have mentioned. Finally, the factors which modify access of oxygen to the blood stream impede egress of carbon dioxide from the body.

These, then, are the gross problems associated with intrathoracic surgery per se. They would all obtain were we to open

the thorax of a perfectly normal adult human being. This, however, we do not do. Thoracic operations are performed on patients with disease of one or another of the intrathoracic organs: the lungs, the esophagus, the diaphragm, the heart, the great vessels, or other mediastinal tissues. Thus, added to the problems incident to surgery are other serious problems arising from the pathologic condition under attack. Let us consider some of these.

There is the matter of age. Many of the conditions requiring thoracic surgery are concentrated at the extremes of life. Many congential anomalies are compatible with life only if corrected surgically. For example, congenital atresia of the esophagus with tracheoesophageal fistula requires surgery within the first week of life and preferably within the first two days, as do many congenital diaphragmatic hernias. Vascular anomalies involving the great vessels of the cardiac outlet, while subjected to surgery somewhat later in life, are associated with curtailment of cardiorespiratory adequacy exceeding even the limitations of the immediate postnatal period. At the extreme from these conditions of childhood are the malignancies, characteristic for the most part of advancing age. Carcinoma of the esophagus, for example, is a disease of the fifth, sixth, and seventh decades, as is also carcinoma of the lung. Such patients, over and above the debility incident to carcinoma and, in the case of esophageal carcinoma, to starvation, present the physiologic pattern of advancing years: reduction in cardiac reserve, peripheral and central arteriosclerosis, inflexibility or at least limitation of vasomotor response, and reduced vital capacity.

On the other hand, those patients who undergo thoracic operations in middle age do so, with rare exceptions, only after prolonged, debilitating illness. Their bodies are depleted of vitality and intoxicated by their disease, and they usually have a disturbance which imposes mechanical as well as physiologic hazards on surgery. These are the patients with tuberculosis, bronchiectasis, lung abscess, empyema, achalasia of the esophagus, or constrictive pericarditis.

This, then, is the problem posed for the thoracic surgeon and his anesthetist: How can such patients be safely relieved of their disease? It goes almost without saying that exactness in diagnosis, both etiologically and topographically, so far as possible, is indispensable to consistently sound thoracic surgery. A thorough diagnosis entails consideration of the physiology of the entire patient, not only his specific disease. It must include an estimate of pulmonary and cardiac reserve, renal function, and the general nutritional status as reflected in plasma protein content, erythrocyte count, and hemoglobin concentration.

Therapeutically, in anticipation of the great strain to be imposed upon the patient's physiologic economy by the operation, every effort must be exerted to bring the body's reserves into as close an approximation to normal as the disease

will permit. The blood volume, plasma protein content, erythrocyte count, and hemoglobin concentration must be brought within the normal range. If cardiac disease is present, it must be corrected if possible. Manifestations of acute inflammatory disease necessitate vigorous measures to overcome the acute toxic state. Particularly in suppurative disease of the lungs, if at all possible, thorough and prolonged transbronchial drainage of the affected areas should be carried out by postural drainage several times daily, and bronchoscopic suction as frequently as necessary in order that purulent material be at a minimum when the patient comes to surgery. Lastly (a point often overlooked), when possible, the patient facing a thoracic operation should be up and walking about as much as is consistent with his disease, in order to maintain muscle and vasomotor tone. It is the surgeon's responsibility to see that these preparatory procedures are executed, but individually and collectively they are of incalculable importance to the anesthetist. If such precautions are not taken, her task becomes infinitely more difficult; if not impossible, to accomplish.

In the immediate preoperative period, certain preparations are now generally used. For prophylactic penicillin saturation of the patient, the drug is administered for two or three days before the operation. Particularly prior to esophageal operations, this is supplemented by the administration of sulfadiazine. The patient's blood must be typed and crossmatched, and several units (500 cc. each) of compatible blood must be drawn and available in the operating room at the time of operation. We regularly request 5 units (2,500 cc.) for adults; the amount for a child is determined by his age and size. For massive surgery, such as total or subtotal esophagectomy, we request that additional blood or donors be available if needed on short notice.

In our clinic, preanesthetic medication consists of nembutal the night before surgery, repeated, for apprehensively alert patients, two hours before the operation. One hour before call to the operating room, morphine is given in doses proportionate to the patient's age and weight; the average adult patient also receives scopolamine. In place of the latter drug, atropine is given to children and to patients past 60 years of age. We are very particular about this point because of the occurrence in several elderly patients of prolonged cyanosis, respiratory depression, and failure to regain consciousness for many hours postoperatively after the use of scopolamine.

Before operation, two cannulas for intravenous drip are placed, one in each internal saphenous vein. The equipment consists of fairly large caliber, open end, malleable cannulas, connected by sections of rubber tubing to three-way stopcocks, which, in turn, are connected to the tubing of the intravenous equipment available in the hospital in which we happen to be working. The cannulas are inserted into the saphenous veins by the "cut down" technic and are anchored

in place. We are aware of the objections to this technic but believe that the security afforded more than offsets the comparatively small danger of subsequent phlebothrombosis. Depending on the patient's individual requirements, this procedure may be carried out under local anesthesia before induction of general anesthesia or may be postponed until after the patient is asleep. The three-way stopcock is inserted to permit the rapid administration of blood with a 50 cc. syringe should the need for it arise. A 50 cc. syringe is kept immediately at hand to avoid the loss of time involved in securing it when needed. The separation of the stopcock from the cannula by rubber tubing permits much freer access to the stopcock than when the two are directly connected. Finally, we object to the use of fine mesh filters interposed between the blood reservoir and the stopcock. They almost invariably clog unless the blood is kept running at an inordinate rate. The newer type of coarse filter made of rubber bars promises to be more satisfactory. Otherwise, we prefer to use the old-fashioned Kelly bottle and to filter the blood into it through a sterile gauze sponge placed in a funnel.

I have dwelt upon the minutiae of this apparatus for a specific reason. Control of fluid administration is left largely to the jurisdiction of the anesthetist. As it is in all clinics, it is our aim to keep intravenous fluid administration at the lowest volume consistent with maintenance of the patient's blood pressure and pulse. However, when a sudden demand arises for large quantities of blood to replace blood lost by sudden large hemorrhage, any failure to be prepared with the needed equipment frequently is catastrophic.

One other detail of preoperative preparation warrants comment. We are opposed to immediate preoperative bronchoscopy. Over and above the apprehension engendered in the patient by this maneuver, it has been our experience that as much, if not more, benefit can be obtained by an hour of preoperative postural drainage. Furthermore, in our experience, such instrumentation has, more than once, led to bleeding which at the time has seemed insignificant, but which later in the course of the procedure has led to the formation of a blood clot sufficiently large to obstruct the airway completely, requiring interruption of the operative procedure for bronchoscopic removal of the clot. This, of course, is of infinitely less significance than the danger of hypoxia involved.

We now come to the controversial phases of the procedure from the viewpoint of anesthesists and surgeons alike. What anesthetic agent should be used, and how should it be administered? By and large, these controversies have been narrowed down to choices between alternatives: nitrous oxide-ether or cyclopropane; intratracheal intubation or simple pharyngeal airway; inflatable cuff or no cuff. Without ado, I shall state our preferences and the reasons influencing us. For all patients except infants, we prefer cyclopropane-oxygen anesthesia ad-

ministered via an intratracheal catheter of relatively large bore, without a cuff.

With little difficulty, one may find in the literature eminent and numerous authorities supporting each of the alternatives. Thus Rovenstine and Eversole favor cyclopropane, whereas Beecher prefers ether. Rovenstine advocates intratracheal or even intrabronchial intubation with a cuffed tube. Beecher deplores the use of all cuffs, but considers the intratracheal tube indispensable.

If one examines the claims of enthusiasts for either ether or cyclopropane, one discovers that the controversy resolves into whether or not cyclopropane should be used. The virtues of ether are tried and true and need no defense. Its disadvantages are equally well known, and it was to offset these that such agents as ethylene and cyclopropane were developed. Ether in anesthetic doses is safe, dependable, and cheap. Contrariwise, it is irritating. Induction with it is rough, unless it is coupled with nitrous oxide, and throughout anesthesia more or less bronchial secretion is elicited, which in suppurative lung disease or tuberculosis can be quite troublesome. Recovery is prolonged, and postoperative nausea may be quite a bother.

Cyclopropane, on the other hand, is nonirritating. Induction is smooth, there are no excessive bronchial secretions to combat, and recovery is rapid, a matter of minutes. Both ether and cyclopropane can be used with high concentrations of oxygen. Both mixtures are explosive. It has been claimed that cyclopropane has a toxic effect on the heart. We know now that this effect is due to vagal stimulation and can be abolished with atropine or novocain block of the vagus nerve. It has been claimed that cyclopropane interferes with oxygen transmission from blood cell to tissue cell. This is probably true, but it is a laboratory rather than a clinical fact. It is claimed that, when repeated aspiration is necessary, it is difficult to keep the patient asleep with cyclopropane. This is also true, but the effect is easily counteracted by the use of small amounts of ether. It is claimed that after cessation of anesthesia with cyclopropane, alveolar collapse and a decrease in blood pressure occur. Our experience fails to confirm this observation, but if these effects are produced, they can easily be overcome by filling the lungs with a heavier nitrous oxide plus oxygen mixture just before the patient awakes and by using small doses of ephedrine or neosynephrin. On the other hand, the secretions induced by ether have, in our experience, been a troublesome source of postoperative atelectasis. In addition, the relatively low blood pressure characteristic of ether anesthesia has not infrequently terrified us. By and large, however, each clinic on the basis of its own experience will decide between ether and cyclopropane.

Concerning the intratracheal tube, I am sure that the overwhelming weight of authority supports its use. To me, there is no question. Except for newborn infants I will never again willingly perform a thoracic

operation upon a patient without intratracheal intubation. The risk involved in not having constant access to the trachea for aspiration is to me unjustifiable. Finally, I need hardly labor the point of carbon dioxide absorption and short coupling of canister to patient to offset dead space.

A word is indicated about control of respiration. We, of course, make extensive use of respiratory control, but we do not like induced apnea. To us, there seems little reason for the routine use of such an unphysiologic technic, and we fear the development of uncontrollable apnea.

After the patient has been put to sleep and the thoracic operation is underway, what is expected of the anesthetist? First, so thorough a grasp of cardiorespiratory physiology that her reactions are almost, if not actually, reflex. In the midst of a thoracic operation there is no time for speculation. Decisions must be made instantaneously. Secondly, alertness. The patient undergoing a thoracic operation lives from minute to minute, not from quarter hour to quarter hour. The evening before a major thoracic procedure is a poor time for a late engagement for either surgeon or anesthetist. Thirdly, co-operation. Nowhere else in the field of surgery does one find such mutual interdependence between surgeon and anesthetist as in intrathoracic surgery. Either can make the other's task relatively easy, or impossible. Ordinary decency should dictate co-operativeness, but if this is an insufficient motive, it is well to remember that the death of a patient due to lack of rapport between surgeon and anesthetist, regardless of who is right, is murder. Both are to blame. In thoracic surgery, as I have just stated, the margin between life and death is measured in minutes. Fourthly, self control. There are few things in thoracic surgery more dangerous than for any member of the team to become excited. During an emergency, the precipitous, purposeless action on the part of one person can completely cancel the effectiveness of the efforts of everyone else. Under such circumstances, every moment counts. Speed is imperative. Haste is disastrous.

The one specific task of the anesthetist in thoracic surgery that overshadows all others is the constant and absolute necessity for maintaining an absolutely clear airway. The great shadow constantly hovering over the patient is hypoxia. Prolonged partial hypoxia is as dangerous as sudden acute obstruction. It is not enough for the anesthetist to depend upon her sense of hearing to detect the two-and-fro movement of particulate matter in the airway. Clotting blood in the bronchus does not move. A slowing pulse, slight changes in rhythm, a slight decrease in blood pressure, and early variations in the patient's color are signs of early partial obstruction demanding clearance of the airway by catheter suction, or, if necessary, by interruption of the procedure and the introduction of a bronchoscope. The anesthetist's watchword, then, must be "keep the airway clear."

It is the anesthetist's further duty to protect and conserve the

patient's cardiorespiratory reserve in the face of continual insult by the surgeon. To offset fatigue of the respiratory muscles of the intact hemithorax, she must intermittently augment the patient's own efforts with rhythmic manual compression of the bag. An almost continuous record of pulse and blood pressure is kept, and, based on this, the anesthetist controls administration of blood—and plasma, if this is used. Sufficient blood must be given to replace blood lost and to counteract any tendency to shock, but, at the same time, the cardiovascular capacity must not be overtaxed. Except when a total pneumonectomy is being done, it is highly desirable that pulmonary tissue be periodically expanded, including that on the side involved in the operation. This maneuver is prophylactic against atelectasis; it washes out carbon dioxide not removed by the absorption canister; and it momentarily permits any accumulated mucus to move into the stem bronchi from which it can be removed by suction.

Finally, the anesthetist is, in a manner of speaking, the surgeon's observer. She must keep him constantly informed of the patient's condition. If surgical manipulation disturbs the patient's equilibrium over any appreciable period, the anesthetist may and should ask the surgeon to desist until that equilibrium can be re-established. Sudden alterations in pulse rate or character, color changes, blood pressure variations, and changes in the pattern of respiration should be called to the surgeon's attention immediately. There are few things more dismaying to a surgeon than to become suddenly aware from his own observation that the patient is dark, that the heart beat has slowed or become irregular, or that spontaneous respiration has stopped. In our clinic, we have established so satisfactory a rapport and such mutual confidence that when, in the anesthetist's opinion, the patient has had enough, as during thoracoplasty, we stop; if our manipulations are too disturbing, she says so, and we ease off. Such co-operation is the very essence of sound thoracic surgery.

SUMMARY

A broad outline of the role of the anesthetist in thoracic surgery has been presented. The details, including some of our own preferences, have been illustrative rather than exhaustive. They reflect the surgeon's viewpoint and represent the opinions current in our clinic based upon our own experience. In no way do they detract from the validity or preferability of conflicting opinions held in the clinics in which you work.

Thoracic surgery cannot help but be as intriguing to the enterprising anesthetist as it is to the advanced surgeon. It is concerned with the essential mechanism for all anesthesia, the cardiorespiratory unit. The field is new, the challenge is great, the horizon limitless, and the reward both spectacular and gratifying. In no other field of surgery is the anesthetist so important, so completely a member of the team, and so vital a factor in the success or failure of the enterprise as in thoracic surgery. This is truly anesthesia come of age.

DIABETES AND ANESTHESIA

Phil B. Bleecker, M.D., F.A.C.P.*
Memphis, Tenn.

Prior to the discovery of insulin in 1921, operations were infrequently performed on diabetic patients; when surgical procedures were done, the mortality rate was extremely high. If the patient survived, the morbidity was severe and the recovery stormy and perilous. In four separate series of cases reported in the literature,[1] the average surgical mortality before the discovery of insulin was 40 per cent in comparison with 16 per cent after the discovery of insulin.

Since the discovery of life-saving insulin, a new vista has been opened in the surgical as well as the medical management of the diabetic individual. The diabetic patient now lives long enough for metabolic, degenerative, and malignant as well as infectious diseases to develop, and we must be prepared to give him the life-saving benefits of surgery. Good surgery, of course, implies an adequate and proper choice of anesthetic, as well as its skilful administration.

The fact that a patient has diabetes does not make him immune to any other condition. He is just as likely to be subject to any of the conditions requiring surgical treatment as the nondiabetic, and he is more susceptible to infections and to complications of his disease requiring surgery. Root says,[2] "Every other diabetic will need surgical treatment before he dies." Consequently, those who care for diabetic patients must take full advantage of modern knowledge of anesthetics, surgical technics, and drugs to make the outcome of an operation on a diabetic patient as safe and uneventful as the same procedure on a nondiabetic patient. However, despite the more optimistic outlook made possible by the decreased mortality rate, an operation on a diabetic is attended by more risk than the same procedure on a nondiabetic.

As the life span of the diabetic has been lengthened by insulin, he has survived to an age when he may be expected to have cancer, cholecystitis, cholelithiasis, degenerative arterial disease, tuberculosis, thyroid disease, gastrointestinal tract involvement (ruptured peptic ulcer or appendicitis), pelvic disease, rectal disease, and disease of the genitourinary tract, all of which re-

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*Assistant Professor of Medicine, University of Tennessee College of Medicine; Member, American Diabetes Association.

1. John, H. J.: Surgery and diabetes. Ann. Surg. **180**: 1052-1073, 1938.

2. Joslin, E. P.; Root, H.; White, P.; Marble, A., and Bailey, C.: *Treatment of Diabetes Mellitus*, ed. 8 (Philadelphia: Lea & Febiger, 1946) p. 665.

quire surgical treatment. Approximately two thirds of all cases of diabetes develop in persons over 40 years of age, and approximately nine tenths of the entire diabetic population is beyond this age. Obviously, degenerative conditions of all types will be frequently associated with diabetes. The increased life span of the diabetic is shown by Joslin's statement: "At ten years of age, the normal child has an expectancy of forty-seven years in contrast to a scant two years a half generation ago."

The diabetic patient's low resistance to infection brings additional problems, such as carbuncles and abscesses, which may require surgical intervention. It should be emphasized, as Root has said, that "the surgical diabetic is the serious diabetic, the diabetic who dies." The surgical diabetic requires far more care and attention than the strictly medical diabetic, and it is imperative that the closest co-operation should exist among the internist, the surgeon, and the anesthetist. The surgeon depends on the internist to have the patient under as good diabetic control as possible prior to the operation. The internist depends on the surgeon to perform the surgical procedure with such dispatch and skill that the duration of the operation and the resultant trauma are minimal. Both the internist and the surgeon depend on the anesthetist to insure a proper choice and capable administration of the anesthetic.

The preoperative use of morphine and atropine is as suitable for diabetics as for nondiabetics.

CHOICE OF ANESTHETIC

Theoretically, the ideal anesthetic should have little or no effect on the diabetic state: it should not be toxic to the liver or kidneys nor be associated with anoxemia. The selection of the agent might well be approached by asking: What are some of the acute complications of diabetes which we fear? They are acidosis, infection, and hyperglycemia. The various anesthetic agents should then be evaluated in the light of their tendency to produce these complications.

The inhalation anesthetics cause certain metabolic and systemic effects in normal persons. These effects are tremendously magnified in the diabetic because of his unstable metabolic state. Chloroform, for example, increases the blood sugar 200 per cent above normal, damages the liver, and promotes acidosis. Chloroform should never be given to a diabetic.

Ether, likewise, suppresses glycogen formation in the liver, increases the blood sugar 100-200 per cent,[3] and causes a diminution of glycogen in the heart muscle.[4] It also augments acidosis, by producing lactic and phosphoric acids in the muscles, and increases the fat content of the blood. Best showed that the blood of a dog anesthetized with ether contains only one-tenth the amount of insulin of that of an unanesthetized dog. Ether, then, depresses endogenous insulin formation, elevates the blood sugar,

3. Bloor, W. R.: Studies on blood fat. I. Variations in the fat content of blood under approximately normal conditions. J. Biol. Chem. **19**:1, 1914.

4. Brow, G. R., and Long, C. N. H.: Biochemical changes in the heart during anesthesia. Anesth. & Analg. **9**:193, 1930.

promotes the formation of ketone bodies, and lowers the CO_2 combining power, thus promoting acidosis if the anesthesia is prolonged. Another effect of serious moment to the diabetic is that ether temporarily diminishes the excretion of urine, nitrogen, glucose, and ketone bodies to augment acidosis and toxemia. The nausea and vomiting following ether administration are also important since they cause dehydration and chloride loss and interfere with the intake of fluid and liquid for hours. This is dangerous since the best results are obtained when the diabetic eats regular meals and takes adequate fluid.

Root's statement bears repetition: "Ether anesthesia is a burden which a light case of diabetes may easily bear, which may change a moderate to a severe case and to a severe case prove fatal, yet with the help of insulin, the harmful effects may be averted." Lundy says that open drop ether should not be used in a debilitated or a severely diabetic patient. In general, other agents are preferable to ether, unless ether will provide better relaxation and therefore expedite the operation or reduce the amount of surgical trauma. Under such conditions, it may be preferred.

In the absence of anoxia, nitrous oxide-oxygen anesthesia does not materially affect the metabolic status of the diabetic to the extent that ether or chloroform does. However, it has the disadvantages of producing poor muscular relaxation and cyanosis. Ethylene has been found to be a safe agent. Cyclopropane has been widely used with a minimum of difficulty. Lahey has used it to good advantage for many of Joslin's patients. It seems safer and has a wider range of usefulness than most of the other inhalation anesthetics.

A major consideration in the use of inhalation anesthetics is the postoperative bronchitis, atelectasis, or pneumonia which follows the administration of many of these agents. The added stress may precipitate diabetic acidosis, which may be fatal.

Local, regional, and spinal anesthetics are the agents of choice and should be used whenever possible. For short procedures, intravenous anesthetics (pentothal sodium) have been quite satisfactory. In order of preference, I would list (1) local, regional, and spinal anesthetics, and (2) ethylene, cyclopropane, nitrous oxide-oxygen, pentothal sodium, and ether.

Preparation for Surgery

If immediate operation is not imperative, it is wise to spend a few days in controlling the diabetic state. The hyperglycemia, glycosuria, and ketosis should be corrected is possible. For a few days, blood sugar determinations should be made before each meal. These will indicate how the insulin is being utilized and will likewise govern the distribution of the insulin throughout the day. This information is of inestimable value during the postoperative period.

The patient is considered to be under good diabetic control if the 24 hour output of glucose is below 10 Gm. A 24 hour urine determination is of considerably more

value than urine tests scattered throughout the day. Random tests may be negative, and yet the 24 hour spill of glucose may be in excess of normal. Contrariwise, several of the specimens may show glucose, but the overall 24 hour collection may be below the 10 Gm. level.

The preoperative diet should be adequate to insure the proper glycogen reserve. The average diet should contain 150-200 Gm. carbohydrate, 70-100 Gm. protein, and fat in sufficient quantity to make up a total caloric value of 2,000-2,200 calories. A liberal intake of fluid is encouraged. If dehydration is present, it may be well to administer normal saline subcutaneously or intravenously supplemented by copious quantities of broth, tea, and water by mouth.

During the immediate preoperative and postoperative period, crystalline or regular insulin is the insulin of choice since it has a shorter action and greater flexibility when metabolic requirements change rapidly and frequently.

On the day of operation, one sixth of the preoperative diet is given in liquid form about 6 A.M. and is preceded by one sixth of the previous day's insulin dosage. One hour before operation, which should be from three to four hours after the 6 A.M. feeding, 500-1,000 cc. of 5 per cent glucose in normal saline should be administered intravenously. No insulin is given at this time because of the danger of a hypoglycemic reaction. Immediately after operation, one sixth of the previous day's insulin requirement is given. Three or four hours after the operation, 1,000 cc. of a 5 per cent solution of glucose in normal saline is given slowly intravenously. The same amount is given every six hours until a liquid diet can be resumed at four hour intervals. Insulin is given every four hours in an amount indicated by the percentage of urine glucose.

John[8] believes that a much more critical evaluation of the diabetic state can be obtained by determining blood sugar every two hours for six to eight hours, then three times a day for three days. When convalescence is established, the regular diet is resumed, and protamine insulin may again be used.

In emergencies, when long term preparation is impossible, the hour or so before operation may be wisely used in making a blood sugar determination and urinalysis. If the blood sugar is excessively high, 20 units of insulin and 1 L. 5 per cent glucose in normal saline may be given intravenously.

REFRIGERATION ANESTHESIA

For diabetic patients, refrigeration anesthesia has very specific uses and in some instances is the outstanding choice, particularly for surgery of the extremities for diabetic gangrene. Amputations for diabetic gangrene make up a large percentage of the operations performed on diabetic individuals. Allen,[5,6,7] a pioneer in

5. Allen, F. M.: Refrigeration anesthesia for limb operations. Anesthesiology **4**:1216, Jan. 1943.
6. Allen, F. M.: Experiments concerning the ligation and refrigeration, with respect to local intoxication and infection. Surg., Gynec. & Obst. **68**:1047-1051, 1939.
7. Allen, F. M.: Reduced temperatures in surgery. Am. J. Surg. **52**:225-237, May, 1944.
8. John, H. J.: *Diabetes: A Concise Presentation* (St. Louis: C. V. Mosby Co., 1946) p. 157.

the field of refrigeration anesthesia, explains the principle thus:

"Basically, refrigeration anesthesia reduces metabolism to a point which is just compatible with tissue vitality. Thus in a leg with advanced arteriosclerosis, metabolism can be reduced to a level where the existing circulation is adequate for the needs of the tissues. Nerve impulses are abolished. Also, one of the fundamental properties of protoplasm, which is irritability, is arrested by cold. Therefore, this method differs fundamentally from all previously known anesthetics in producing anesthesia, not only of nerves but of protoplasm."

One factor of paramount importance is that under refrigeration anesthesia shock is nonexistent, and the duration and degree of tissue trauma are immaterial. Postoperative pain is markedly reduced, necrosis is prevented, and a definite inhibition of bacterial growth occurs with a decrease in the incidence of infection.

The chief draw-back to refrigeration anesthesia is that healing is slightly delayed. It is important to remember that refrigeration is the chilling, not the freezing, of tissues. Freezing damages tissue; refrigeration does not.

The first step in producing refrigeration anesthesia is the application of a tourniquet. Without it, the circulating blood in the extremity would prevent complete refrigeration. The length of time usually required for satisfactory refrigeration is two to four hours.

Frequently, patients with diabetic or arteriosclerotic gangrene are so debilitated and weakened by sepsis that they are extremely poor operative risks. Many are sorely in need of amputation but are allowed to die because experience and judgment tell us that they could not possibly survive an operation with the conventional methods of anesthesia and surgical technics. It is for this group of poor risk patients that refrigeration anesthesia has its major indication.

Refrigeration anesthesia may also be useful in a therapeutic way for diabetic patients. Chilling inhibits the absorption of toxic products and prevents bacterial activity and thus may be a life-saving procedure in a debilitated septic patient. It is almost phenomenal to observe an extremely ill, toxic patient, with chills and a spiking type of temperature curve, lose the fever and have a return to normal of his pulse rate when the gangrenous, infected limb is packed in ice.

A tourniquet is not necessary unless amputation is to be performed. The procedure is carried out by immersing the limb in ice water, applying pure gum rubber ice bags, or preferably by packing it in finely cracked ice. A wooden box may be devised to hold the extremity so that ice may be packed about it. Expensive or complicated apparatus is not required. That the patient need miss no insulin injection nor a single meal is most important in the maintenance of diabetic control.

In this country, the mortality rate for operations for diabetic gangrene varies from 12 to 65 per cent. In several series of cases

in which refrigeration anesthesia was used, the mortality rate ranged from 0 to 12 per cent, although most of the patients chosen for this type of anesthesia were aged and all were poor operative risks. In general they were patients who could not be subjected to any other type of anesthesia.

The technic, as advocated by Bancroft, Fuller, and Ruggiero and as used with some modifications at the John Gaston Hospital, is as follows:

Three hours before operation morphine may be given but is not always necessary. One half hour later, the area to which a tourniquet is to be applied is covered with ice. Ten minutes later, a narrow, pure gum rubber tourniquet is applied, just tight enough to shut off the circulation, about 6 inches above the upper level of the skin incision and above the line where the bone is to be amputated. The leg is then encased in 50 pounds of cracked ice, extending 2 inches proximal to the tourniquet. The ice and leg are then encased in a rubber sheet. The head of the bed is elevated so that the water will drain into a receptacle at the foot of the bed.

Experience has shown that for amputation at the thigh, two and one-half hours of refrigeration are necessary. For disarticulation at the knee or amputation through the middle of the leg, two hours are required. For amputation of the foot, one and one-half hours are sufficient. For metatarsus or toe amputation, the area should be refrigerated for one hour only. The thickness of the limb influences somewhat the length of time it should be refrigerated, e.g., a thin emaciated leg should not be encased in ice as long as a thick, muscular leg.

With the leg still encased in ice, the patient is then brought in bed to the operating room, where everything is in readiness for the operation. The surgical team is gowned and ready to proceed with the amputation. All instruments are in a basin of cold, sterile water. The ice is then removed from the extremity, and the patient is transferred to the operating table. The extremity is prepared in the routine manner and the amputation performed.

SUMMARY

1. Insofar as possible, the diabetic state should be under control before surgery is attempted.

2. The choice of the anesthetic depends on the surgical indications. General anesthetics are poorly borne by diabetics, and whenever feasible, local, regional, spinal, intravenous, or refrigeration anesthesia should be used.

3. Operations on diabetics were formerly looked upon with fear and trembling by physician and surgeon alike. However, with insulin and the newer anesthetic agents and improved surgical technics, operations can now be undertaken on diabetics with nearly the same safety as on normal individuals, provided the patient is in good diabetic control.

PSYCHOSOMATIC ELEMENTS IN ANESTHESIA

Ernest H. Parsons, M.D.*
St. Louis

In discussing some of the psychosomatic elements of anesthesiology, I should like to pay tribute to the field of anesthesia, first, for its contribution to the emotional health of the patient and, secondly, for its contribution to psychiatry of certain technics, especially the use of pentothal sodium, during the recent war.

Without using the rather clumsy word "psychosomatic," anesthesiology has from its ancient beginnings considered the patient as a person for whom the shock of trauma must be cushioned by the best means available. This, in essence, is the implication of psychosomatic medicine—the consideration of disease or trauma made up of integrated physiologic, psychologic, emotional, and physical factors.[1-4] Psychosomatically, therefore, in a given case, one may consider, for example, a particular person with an individual background, development, personality pattern, situational factors, and a perforated peptic ulcer. The fact that patients are people was not entirely overlooked by medicine prior to the coinage of the word "psychosomatic." Socrates[2] is said to have returned from the second Thracian campaign and criticized the Athenian physicians for failing to treat the mind as well as the body. He stated that ". . . the reason why the cure of many diseases is unknown to the physicians of Hellas [is] because they are ignorant of the whole [person]."

Much later, but still 85 years ago, one of the most astute clinicians of all time, Sir Clifford Allbutt,[5] observed that in some disorders the whole person was overlooked in the enthusiasm of physicians of that time for minimal, and often insignificant, organic pathology. His comments concerning what he called the "neuralgic woman" are of interest:

"A neuralgic woman seems to me to be particularly unfortunate. However bitter and however repeated may be her visceral neuralgias, she is told either that she is hysterical or that it is all uterus. In the first place she is only slighted; in the second case she is entangled in the net of the gynecologist who finds her uter-

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*From the Department of Neuropsychiatry, Washington University School of Medicine.

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2. Strecker, E. A.: Psychosomatics. J.A.M.A. **134**: 1520, Aug. 30, 1947.
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4. Strecker, E. A.: *Fundamentals of Psychiatry* (Philadelphia: J. B. Lippincott Co., 1942).
5. Weiss, E., and English, O. S.: *Psychosomatic Medicine* (Philadelphia: W. B. Saunders & Co., 1943).

us, like her nose, a little on one side, or again, like that organ, is running a little, or it is flabby as her biceps so that the unhappy viscus is impaled upon a stem, or perched upon a prop, or is painted with carbolic acid every week in the year except during the long vacation . . . . Her mind thus fastened to a more or less nasty mystery becomes newly apprehensive and physically introspective and the morbid chains are riveted more strongly than before."

Fortunately, the charges made by Allbutt are no longer valid. The gynecologist of today is conscious of his patient as a whole person.

While our ancestors recognized that there were emotional factors in many illnesses, these were considered as unscientific, vague, and too occult for scientific medical interest. But even Virchow,[6] the father of modern pathology, was impressed in his clinical days with the emotional problems of a patient undergoing ether anesthesia. He observed that anxious, insecure patients were more likely to demonstrate what he termed "intoxication with grave consequences during an operation." Cannon[7] and Pavlov[8] demonstrated the physiologic components of various emotions, and it became clear that there was a scientific relationship between emotional states and bodily reactions. However, the origin of emotions remained a complete mystery until fairly recently. Slowly a rather considerable body of data has been collected, which, when scientifically applied, permits clinically accurate estimations. These data may be summarized as indicating clear-cut relationships between psychopathology and the emotional state in ill health. Such vague terms as "a neurotic element," "neurogenic factors," and the like are meaningless.

In the case of peptic ulcer, for example, I[9] have pointed out elsewhere the establishment of several fundamental determinations:

1. The variability of gastrointestinal motility, secretions, and blood flow initiated by emotional states. This has been demonstrated in animals, in human subjects by intubation, and in human subjects with gastric fistulas.[10]
2. The direct effect of injury and disease of the central nervous system upon the gastroduodenal tract. This has been demonstrated in human patients and reproduced in animal experiments.
3. The emotional characteristics of patients with the gastroduodenal dysfunction syndrome are deep hostility, aggressiveness, imagination, productivity, and subjective insecurity. This has been demonstrated by analysis and verified by therapeutic application.

6. Robinson, Victor: *Victory over Pain* (New York: Henry Schuman, 1946).
7. Cannon, W. B.: *Body Changes in Pain, Hunger, Fear and Rage. An Account of Recent Research into the Function of Emotional Excitement,* ed.2 (Philadelphia: Appleton Century Co., 1936).
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10. Wolf, Stewart, and Wolf, H. G.: *Human Gastric Function, an Experimental Study of a Man and His Stomach* (New York & London: Oxford University Press, 1943).

Time does not permit a discussion of the psychopathology and emotional aspects of some vascular disorders, allergic phenomena, cephalalgia, thyroid disease, and diabetes, to name only a few of the fields in which a reasonable amount of work has been done. One can, I believe, state that there are certain disorders, especially in the field of internal medicine, in which satisfactory therapy must be based upon consideration of the emotional as well as the organic pathologic condition. A beginning, at least, has been made in understanding that what we have called "functional illnesses" are truly disorders of function which arise in a definite manner, progress in a predictable course, and, finally, are amenable to appropriate therapy.

I have previously referred to the field of anesthesiology as one which has made contributions to emotional health. This is evident if one reviews Robinson's[6] excellent history of the field. The trauma of surgical procedures before the days of Simpson, Morton, Long, and the many other founders of the science of anesthesiology was almost beyond the power of description. This trauma was not limited to the physiologic insult of fluid loss, histamine release, mineral shifts, hemorrhage, and the like but included trauma to the whole person in the literal sense of the word. Among Simpson's letters was one from "An Old Patient" who was later identified as George Wilson,[6] a physician and scientist of his day. He wrote of the amputation of his right leg without benefit of anesthesia, only a few years before the advent of chloroform:

". . . During the operation, in spite of the pain it occasioned, my senses were preternaturally acute, as I have been told they generally are in patients in such circumstances. I watched all that the surgeons did with a fascinated intensity. I still recall with unwelcome vividness the spreading out of the instruments; the twisting of the tourniquet; the first incision; the fingering of the sawed bone; the sponge pressed on the flap; the tying of the blood vessels; the stitching of the skin; and the bloody dismembered limb lying on the floor. Those are not pleasant remembrances. For a long time they haunted me, and even now they are easily resuscitated; and though they cannot bring back the suffering attending the events which give them a place in my memory, they can occasion a suffering of their own, and be the cause of a disquiet which favours neither mental nor bodily health."

These were the feelings or emotions of a surgical patient before the development of anesthesia. Fortunately, patients today do not go through such experiences, nor do they have such memories.

The development of anesthesiology to its present state has been remarkably similar to the development of the concepts and therapeutic applications of psychosomatic medicine. The use of wine of mandrake root, for example, is comparable with our early concept of a "neurogenic element" in

6. Robinson, loc. cit.

some disorders. The use of chloroform is closely paralleled in our field of experience with mesmerism and animal magnetism. As a matter of fact, the fields of psychiatry and anesthesiology met at this point, for hypnotism was popular as a method of anesthesia at the time ether was first used. Even the small teapot hurricanes for the kudos of discovery in anesthesia have unfortunately had their counterparts in pyschopathology and psychodynamics. Finally, the application of anesthesia has not been altogether smooth, either technically or in terms of acceptance by both the profession and the public. Relief from pain is now not only accepted by your patients but is expected by all concerned. There was a time, less than 100 years ago, when this was not true. You may recall with amusement the cry that arose when obstetric anesthesia was introduced. But it was not amusing then; it was serious. Your predecessors were, in some black-magic manner, preventing the normal operation of Divine Will that women should suffer. Even sturdy men felt that the acceptance of anesthesia indicated some character weakness. It was believed that a real man should be able to "take it." This last concept succumbed, of course, before the stern reality of pain, shock, and trauma. Yet, to me, it is quite comparable with some of the "growing pains" of psychosomatic medicine.

With the development of histopathologic technics, bacteriologic discoveries, and physiologic advancements, medicine was well on the road to complete mechanization. Fifty years ago, medicine, including anesthesiology, was a science, exact and applicable mathematically. But it hasn't developed as we thought it would then. Patients continue to be people, well or sick, conscious or anesthetized. The study of people and the scientific evaluation of them has required different, nonmechanical technics.

Even anesthesiology is not wholly mechanical. I have referred to Virchow's observations on the anxious patient receiving ether. I am sure that each of you has observed that there is no direct mathematical relationship between body weight, surface area, age, sex, and operative procedure and the amount of a given anesthetic required. You have observed that the alcoholic seems to "drink" ether, whereas another, more placid person is quickly anesthetized and requires less drug for the operation. Your ability to judge the dosage and to hold the patient at the required level of anesthesia is often termed the art of your profession. This art is much more scientific than is often realized. The calm, obviously competent anesthetist evaluates her patient as a person when she first meets him. Her movements are as important to the patient as his tremors are to her. The more she knows of him, the more capable she is of inducing and maintaining the desired level of anesthesia. These skills are established early in the training of an anesthetist. I believe much of the art of your specialty may be reduced to scientific or measured terms, for this art is actually the ability of the trained specialist to estimate the degree of anxiety

and emotional stability present in the person to be anesthetized.

It would be of interest to study scientifically the personality of the patient and to correlate this with the emotional factors, surgical pathology, operative procedure, type of anesthesia, dosage required, and reactions. Because of my experience in fields more closely related to internal medicine than to surgery, I would surmise that a much better selection of anesthetics will be made when the patient as a person is considered together with the type of operation to be performed. Certainly, the anxious, apprehensive, insecure young mother with three small children, a limited income, and perhaps almost no understanding of her organic disease presents a different problem in anesthesia than does the quiet, calm young man with an excellent background, no dependents, an adequate income, and a reasonable understanding that a hemorrhoidectomy is not a major operation. For both persons the operative procedure is the same, but the persons are vastly different. Should the same anesthetic be used for both patients? Will the reactions of the patients be the same? Will the postanesthetic course of the two be identical? These and similar questions are best answered by you. It is my hope that within the next year some of you may undertake such studies; for from such observations will come better anesthesia.

Summary

The development of the present concept of psychosomatic medicine has been considered briefly. Anesthesiology has, I believe, led the way in medicine in terms of its constant consideration of the patient. The scientific data of personality study, psychopathology, and emotional reactions are applicable to the field of anesthesiology. If the patient as a whole is considered, the selection, use, and dosage of anesthetics should give smoother anesthesia, better surgical opportunity, and fewer postoperative complications.

CO-OPERATION

(*Continued from page* 15)

The status of lay members is one which could be controlled by the professional group. However, the interest of lay people is obviously important if we are going to achieve our own aims.

In conclusion I'd like to use a little illustration to show just what we are trying to do in the profession and how we can interpret our aims to other people. A man stopped three workers busily engaged in chipping stone near a building that was to be erected. He said to the first worker, "What are you doing?" and the man said, "Why, I'm chipping rock."

He turned to the second one and said, "What are you doing?" and he said, "Well, I'm earning eight dollars a day."

And he turned to the third one and said, "What are you doing?" and he said, "I'm helping to build a cathedral in which to worship God."

I think at times we tend to interpret nursing to the public in the wrong way.

EFFECTS OF ANESTHESIA ON THE COMPOSITION OF BODY FLUIDS

William B. McIntyre, M.D.*
Detroit

The great French physiologist Claude Bernard made the observation that the human organism really exists in a fluid element, the blood and lymph, which bathes the living tissue cells. Physiologists and biochemists since the middle of the nineteenth century not only have supplied proof for this premise but have given the study of this fluid element an importance which is recognized throughout the medical realm. It is recognized that the living organism depends on this medium for tissue nutrition, respiration, and excretion. Through it, physicochemical stability, in terms of hydrogen ion equilibrium and temperature, is provided.[1]

Because all the effects of anesthesia upon this fluid mass are too numerous to recount, this discussion will be limited to the effect of some anesthetic agents on the composition of the extracellular fluid mass.

The extracellular fluid mass constitutes 20 per cent of the body weight, 25 per cent of this mass being within the confines of the circulatory system as plasma. The remainder is in the interstitial spaces. Slight but significant changes constantly occur in this fluid mass to maintain the organism in a proper state of nutrition as well as electrolyte and water balance.[1,2] Definite alterations in its quantity and components are produced by many disease states and the administration of many anesthetic agents.

An understanding of certain of the fundamentals of water balance and the chemical components of the body fluids is necessary before their aberrations can be described.

Water constitutes about 70 per cent of the body weight, is received normally through the alimentary canal, and is lost through the urinary tract, skin, lungs, and intestines. The renal, intestinal, and respiratory systems serve as selective regulators, eliminating or conserving water as the organism requires. The electrolytes (sodium, potassium, calcium, and magnesium serving as bases; chlorides, acid phosphates, sulfates, organic acids, carbonic acid, and proteins serving as acids) remain relatively constant in concentration

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*Medical Staff, Grace Hospital.

1. Gamble, J. L.: *Extracellular Fluid* (Cambridge: Harvard Univ. Press, 1942).

2. Cantarow, Abraham, and Trumper, Max: *Clinical Biochemistry* (Philadelphia: W. B. Saunders Co., 1945).

despite the continual changes demanded by body metabolism. The aforementioned selective regulators aid in the maintenance of this constancy of concentration. Gamble[1] states that the mechanics of the circulation of the blood make the maintenance of a normal volume of fluid in the vascular compartment more important than the fluid mass in the interstitial space. While the former constitutes about 25 per cent of the extracellular fluid, it is in constant activity, passing from the confines of the vascular compartment to the interstices and at the same time receiving a similar amount from the interstitial fluid bed. For example, a 70 kg. man has a daily turn-over of 4,000-16,000 cc. fluid,[3] from a circulating medium containing about 3,500 cc. plasma.[2, 3] Hence study of blood volume and composition affords the best index to the existing state of body fluids in the patient.

The electrolytes in the extracellular fluid together with hemoglobin and the plasma proteins form the buffer systems in the blood and tissues. These systems serve to maintain the pH at a nearly constant normal of 7.4 when acids or alkalis are added. Sorensen groups these under the following headings:

1. **Bicarbonate system** consisting of carbonic acid and bicarbonate, which react with the basic substances sodium ($Na+$) in the plasma and potassium ($K+$) in the cells. Acids stronger than H_2CO_3 cannot survive in the blood or tissues without the formation of a neutral salt ($HCl + NaHCO_3 \rightarrow NaCl + H_2CO_3$). Alkalis are similarly neutralized ($NaOH + H_2CO_3 \rightarrow NaHCO_3 + H_2O$). Thus the bicarbonate system efficiently maintains the normal hydrogen ion concentration of the circulating streams. The excess of carbon dioxide (from carbonic acid) is constantly removed through the lungs. Excesses of alkalis formed are neutralized by the formation of CO_2 through the processes of oxidation constantly taking place. The bicarbonate system, or more correctly the blood bicarbonate, because of the abundance of its supply of base and its availability for neutralization of fixed acids, has been called the "alkali reserve" by Van Slyke and Cullen.
2. **The phosphate system** is similar in action to the bicarbonate system but produces its buffer action with monosodium phosphate and disodium phosphate. Monosodium phosphate being weakly acid reacts with alkalis to form disodium phosphate, which is weakly alkaline. Disodium phosphate similarly reacts with acids to form a neutral salt and water. This is accomplished with little change in the hydrogen ion concentration or the pH of the circulating fluid.
3. **Hemoglobin and the plasma proteins,** which through their amphoteric properties

1. Gamble, loc. cit.
2. Cantarow, loc. cit.
3. Adolph, E. F.: The metabolism and distribution of water in the body and tissues. Physiol. Rev. 13:336, 1933.

serve as weak acids, combine with a small amount of base and form about 10 per cent of the buffer activity in the blood. The interchange of chloride and bicarbonate ions, which takes place between the plasma and the corpuscles, the "chloride shift," which occurs in the pulmonary circulation, is considered a part of this system. According to Van Slyke, hemoglobin and the sodium chloride of the plasma serve to take care of 85-90 per cent of the blood and tissue carbonic acid through this mechanism.

The discussion thus far has dealt with normal physiology, but the physiology of the anesthetized patient can hardly be considered normal. The very disease for which the patient undergoes surgery and consequently anesthesia is usually sufficient to affect to a greater or lesser degree the nutrition, hydration, and electrolyte balance of that person.[4] Pulmonary neoplasm, intestinal obstruction—high or low, complete or incomplete, due to hernia, neoplasm, or inflammation—exophthalmic goiter, a fracture of the femur, or even acute appendicitis will cause variations in water and electrolyte balance in the patient.[5,6] Although such variations are ascertained and corrected to some extent before surgery, all too often the correction is delayed until the operation is completed. There are not many entities for which a patient receives an anesthetic in which the foregoing is not true at least in a small measure. When the elements of hemorrhage, shock, diarrhea, prolonged vomiting, and pyrexia are added, further abnormalities are expected.[4,5,7] Should that person have diabetes, renal disease,[8,10] congestive heart failure[9] bronchial asthma, emphysema, or any other clinical entity affecting the elimination or conservation of water or electrolytes or the proper gaseous interchange in the pulmonary alveoli, the problem of the internist, surgeon, and anesthetist is one which will not be solved by snap judgment or by a "routine" for one or another type of case.

In those cases in which the above mentioned hazards may be regarded as minimal or nonexistent, i.e., when the patient is in a physiologic state of nutrition as well as water and electrolyte balance, the surgical procedure itself contributes to a change in quantity and composition of the body fluids. The patient, wrapped in blankets, shackled, enshrouded in sterile drapes, in an atmosphere properly kept above room temperature, perspires more freely than do the unencumbered who

4. Abbott, W. E.: Chemical alterations occurring in the surgical patient and their interpretations. Surgery **20**:770-785, 1946.

5. Abbott, W. E., and Mellers, R. C.: Fluid, protein and electrolyte alteration in experimental intestinal obstruction. Ann. Surg. **117**: 39-51, 1943.

6. Thornton, T. F., Jr.; Adams, W. C., and Shafter, P. W.: Hypoproteinemia in thoracic surgery: A clinical study. Surg., Gynec. & Obst. **79**: 368-373, 1944.

7. McIver, M. A.: Study in extensive cutaneous burns. Ann. Surg. **97**: 670-682, 1933.

8. Lauson, H. D.; Bradley, S. E., and Cournand, A.: The renal circulation in shock. J. Clin. Investigation **23**: 381-402, 1944.

9. Schemm, F. R.: A high fluid intake in management of edema, especially cardiac edema. II Clinical observation and data. Ann. Int. Med. **21**: 937-976, 1944.

10. Browne, J. S. L.; Karady, S., and Selye H.: Effect of noxious agents on creatinine, creatine, chloride and water excretion. J. Physiol. **97**: 1-7, 1939.

attend him. Appreciable fluid and chlorides are lost by this alone.[4] Blood and fluid loss incident to the operative procedure added to this results in an appreciable shift in extracellular and intracellular fluid. Fluid loss from these factors alone may be sufficient to affect renal function. Indeed it has been shown repeatedly that shock, anoxia, and trauma may impair the elimination of chloride, water, and various solutes, especially wastes, by way of the kidneys.[8,10] This alone alters the function of one of the most important regulators of fluid and electrolyte balance, and resilient though the chemical structure of the extracellular fluid may be, the burden under these circumstances is one requiring thoughtful correction.

Anesthesia contributes to the change in blood volume, acid-base balance, and electrolyte content in many ways. The alkali reserve is diminished during ether and chloroform administration and to a lesser degree during nitrous oxide and ethylene anesthesia. Ketosis is not uncommon in long anesthesias, and ketonuria is occasionally encountered.[11] Many observers have noted that the acidosis produced is in a nearly direct ratio to the depth of the anesthesia as well as to the duration. The acidosis produced is believed by Henderson to be due to a reduction of carbon dioxide tension with a loss in plasma bicarbonate as a result of hyperventilation. Ketosis contributes little to this acidosis.

Prolongation of ether anesthesia has been shown to depress renal function and thereby impair the elimination of sodium and chloride ions postoperatively. This coupled with the abnormal fluid loss commonly encountered in prolonged procedures may result in some degree of azotemia (N_2 retention). With this depression of renal function there are reductions in the amount of glomerular filtration and in the elimination of base. While this may compensate in some degree, it does not offset the acidosis produced.

Changes in blood volume and interstitial fluid volume during anesthesia are numerous and depend largely on the type of anesthesia. Ether alone, or with morphine or atropine, has been shown to increase the interstitial fluid volume. This usually occurs at the expense of plasma volume. Barbiturates have produced an increase of plasma volume with a decrease of interstitial fluid. Pentothal and cyclopropane have produced no marked changes in the plasma or interstitial fluid volume. The work of Bonnycastle[12] has noted this together with the other significant changes of plasma volume, whole blood volume, and red cell volume in dogs under various anesthetics.

Plasma proteins, albumin, globulin, and fibrinogen, serve not only to maintain the nutrition and blood coagulation mechanism of the patient but also to maintain fluid balance between the circu-

(*Continued on page 70*)

4. Abbott, loc. cit.
8. Lauson, loc. cit.
10. Browne, loc. cit.
11. Rees, V. L., and Lob, V. L.: Effects of ether anesthesia on renal function. Univ. Hosp. Bull., Ann Arbor **9**: 70-71, 1943.
12. Bonnycastle, D. D.: The effect of some anesthetic agents on the volume of body fluid. J. Pharm. & Exp. Therap. **75**: 1, 1942.

LABORATORY DATA AN ANESTHETIST SHOULD KNOW

W. A. Chipman, M.D., F.I.C.S.*
Detroit

Any intelligent discussion of the normal and abnormal findings in the urine and blood requires at least a partial knowledge of the physiology of the fluids of the body. Two extensive systems of the body are at play in anesthesia, more or less: the respiratory system, through which inhalation anesthetics are given, and the body fluids, which transport these agents to the body cells, producing the anesthesia. As you know, about 70 per cent of the body weight is fluid. This may be divided into extracellular fluid, or about 20 per cent of the body weight, and intracellular fluid, which represents about 50 per cent of the body weight. About 5 per cent of the body weight is represented by the blood stream and 15 per cent by the interstitial cellular fluids. This extracellular fluid, 20 per cent of the body weight, serves as a means of transportation, transporting the anesthetic agent, carrying oxygen, electrolytes, and food components to the cells, and taking from the cells the products of catabolism.

Fluids enter the body by three routes: those imbibed as fluids, those relatively solid foods which have a fluid content, and the water that results from catabolism, organic compounds burning to produce carbon dioxide and water. In addition, during stages of illness there may be parenteral administration of fluids.

As stated previously, the extracellular fluids serve to transport oxygen or other gases as used in anesthesia, electrolytes, and protein elements. If the relationship of these elements varies markedly death results. The electrolytes are so finely balanced that the blood pH rarely varies much from the figure 7.45; by the same token the variance of the interstitial fluids is no greater. In general these electrolytes are made up of two classes, those with positive valence, or cations, and those with negative valence, or anions. In the blood stream there is a moderate amount of proteins, usually in normal health from 6.5 to 7.5 mg. per cent. The electrolytes of the extracellular fluids are quite similar and quite constant. A variation in one direction produces the clinical syndrome known as acidosis, and in the other direction, alkalosis. This variation chemically is slight, slight because of the buffered salts which may be present as basis ions (carbonates and

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*Senior Attending Surgeon and Chief of Staff, Mt. Carmel Mercy Hospital.

phosphates) or as acid ions (acid carbonates and acid phosphates).

Very briefly two deviations from normal should be considered: dehydration and acidosis. Dehydration results from one of two possible causes, or both, namely, inadequate intake, or excessive loss, of fluid. It is manifested by the usual dry skin, dry mucosa, and tenacious mucus in the throat (especially important from the anesthetist's viewpoint because of the relationship to atelectasis). Mechanically, it means inability of the transportation system to carry its load, thus, inadequate oxygen transportation (anoxia) and inadequate elimination of the products of catabolism. Urinary outputs decrease to the vanishing point. The anoxia leads to capillary wall damage, which, associated with the decreased blood volume and decreased volume flow, leads to clumping of the blood cells and thrombosis. Shock is present in fact, or potentially, in every severely dehydrated patient; the slightest added insult could, and often does, mean death.

With dehydration the commoner picture is acidosis. The opposite, alkalosis, less frequently is seen, and lack of time precludes discussing this clinical entity. The body mechanics utilize the liberation of carbon dioxide from the lungs primarily in the control of acidosis. There are numerous other means, but this is perhaps the most important, certainly to an anesthetist. The urine contains products of incomplete oxidation, such as ketone bodies and diacetic acid, as well as acetone. It becomes a very difficult, if not an impossible, task to use anesthesia with any degree of safety owing mainly to oxygen deficiency states, known as anoxia, which develop. Anoxia further increases the acidosis.

This very brief review of the physiology is all that time allows and is given only to refresh your memory about subjects that you have spent many hours studying in your training period.

Five per cent of the body fluids is represented by the blood, of which about 91 per cent is water. The 8 to 9 per cent that is solid comprises the three types of cells, erythrocytes, leukocytes, and thrombocytes; inorganic substances; organic substances; respiratory gases; compliment, antibodies, hormones, and enzymes. Needless to say, all of these cannot be discussed here. The oxygen-carrying component of the blood is hemoglobin. It may be reported in grams or percentages. The latter are quite variable because three different scales are used to represent 100 per cent. For greater accuracy, grams per 100 cc. will be used. Transitory anesthesia is permitted in drastic emergencies with hemoglobin figures as low as 8.5 Gm., or about 56.5 per cent, if 15 Gm. is the figure used to represent 100 per cent. Prolonged anesthesia is absolutely contraindicated, and rare is the emergency that does not allow for transfusion prior to the induction of anesthesia (obstetric hemorrhage). Nitrous oxide and ethylene are the two least desirable under the circumstances, owing to the high percentage of anesthetic gas and low percentage of oxygen necessary for an-

esthesia: 90-10 in the former and 85-15 in the latter. Anoxia will almost certainly result. A figure of 12.0 Gm. is the lowest figure allowable for prolonged anesthesia, such as for gastric resections, and here transfusion should be given during the operation. Any figure above 16.5 Gm. suggests either hemoconcentration (early shock) or polycythemia. The dangers of giving anesthesia in incipient shock are so great that figures of 16 to 16.5 Gm. should cause considerable anxiety; examinations should be repeated to exclude possible error, as well as to amplify your understanding of the condition.

Erythrocyte counts often are correlated with hemoglobin findings, but this is not necessarily true. Erythrocyte counts under 3,000,000 preclude any but transitory anesthesia (such as for packing a uterus); counts under 3,500,000 contraindicate anesthesia of more than 20 to 30 minutes. For extended major surgery the count should be at least 4,000,000. Normal counts for women should read near 4,500,000 and for men about a half million higher. High counts, such as those in excess of 5,500,000, should have the same import as high hemoglobin figures, demand the same searching scrutiny as to cause, and demand the same precautions when anesthesia is imperative.

The white count is usually broken down into what is commonly referred to as the differential count. The total is usually near 10,000 in infants and drops to near 7,000 in adult life. Polynuclear cells in the granulocytic series should not exceed 65 per cent, usually somewhat less; in this series the nonsegmented granulocytes (stab cells) should not exceed 3 per cent normally. Lymphocytes should not exceed 35 per cent normally. Monocytes represent 1 to 5 per cent, but higher figures may mean subsiding infection. Basophilic and eosinophilic granulocytes are 1 per cent or less in usual normals. A white blood cell count of less than 4,000 or higher than 40,000 should be looked upon with considerable gravity, the lesser count signifying in many cases a patient beyond the ability to produce a defensive reaction, and the higher count signifying extreme infection, most likely complicated by marked hemoconcentration, or an infection that is not surgical, such as pneumonia. Nonsegmented granulocytes in excess of 25 per cent likewise signify a very serious infection, but they do not contraindicate anesthesia.

Thrombocytes are rarely reported but in the presence of certain disease processes are of great importance, especially if the coagulation time, bleeding time, and prothrombin time findings are at variance with the normals for the hospital. A low normal is usually considered to be 250,000.

Coagulation time, bleeding time, and prothrombin times must be compared with the normals for your hospital. Numerous manners of deriving these times vary too much to give a normal. In general, if these findings appear on the chart, the surgeon is anticipating trouble; thus a detailed discussion of the anesthesia hazards should pre-

cede the induction, with careful evaluation of the risks. One minor exception might be here given: a prothrombin time alone is reported for older patients when it is possible they are prone to blood clot, thus likely to develop thrombosis. Fifteen to 20 per cent above normal should be seriously considered, and the anesthetic should carry an excess oxygen supply. The position on the table should also be such as to avoid any pressure on the larger veins of either extremity.

Serum protein levels are much more frequently listed in the laboratory findings than they were 10 years ago. The main difference between the serum fluid (plasma) and the interstitial fluid is that plasma contains proteins in appreciable amounts, interstitial protein being nearly absent. Clinically, serum protein levels below 6.0 Gm. should contraindicate all forms of surgery that are not essentially minor or brief. This rule is equally true for the anesthesia. Edema of the lung is much more frequently seen in the presence of low or falling serum protein levels (so-called wet lung). This condition (wet lung) likewise leads to anoxia, capillary damage, slowed circulation time, and diminished circulation volume, i.e., all of the early phases of shock as recognized by laboratory technics. The surgeon is, or should be, very cautious when any major procedure is contemplated; he should discuss any variation in the serum protein levels, or reversal of the albumin-globulin ratio, if such is present. A serum protein level below 5.5 Gm. is as much a contraindication to surgery or anesthesia as a hemoglobin of 10.0 Gm. or an erythrocyte count of 3,500,000; it is not an absolute contraindication, but one calling for further preparation of the patient if such is possible.

When anesthesia is given to a patient with low serum protein levels, two features are likely to be noted: a variable blood pressure lacking all stability and a rapid, irregular heart rate. Anoxia leads to further depletion by transudation of electrolytes and, to some degree, of protein elements as well, a steady decrease in the blood volume, and eventually to a falling blood pressure and a weak, rapid heart action. Adrenalin often was given in these states, actually lowering the blood pressure further and further decreasing the circulating blood volume. This is due not only to the anoxia but to the increase in heart rate, systole occurring earlier in diastole, with consequent decrease in the filling of the heart and consequent decrease in cardiac output.

Drugs of all types are here contraindicated, but especially is this true of the adrenogenous drugs. Curare, a cholinergic drug, is frequently used in anesthesia. Its use is likewise dangerous under these conditions, as it definitely depresses skeletal muscle action, and thus has a tendency to decrease circulating volume by allowing an increase of interstitial fluid at the expense of the plasma fluids as well as allowing greater pooling of blood in the muscles.

Blood sugar determinations are rarely present if urinary sugar has not been found. Needless to say, elevated blood sugar

findings should be viewed with alarm, because the oxidation processes of the body are usually taxed to the limit to maintain relative normalcy of the electrolytes and organic acids (ketones, betahydroxybutyric acid, and diacetic acid). Any anesthesia is prone to produce varying grades of anoxia, even slight anoxia being highly dangerous under these conditions. Ether is prone to encourage acidosis in such cases, since it is a sympathomimetic agent, causing further increase in circulating blood sugar, with a resultant tendency to acidosis.

Nitrogen retention, as evidenced by elevation of either the nonprotein nitrogen or urea findings, especially if associated with an increase of ammonia in the urine, is indicative of an acidosis of varying grades, depending upon the degree of the findings, 40 mg. being the upper limit of normal for nonprotein nitrogen. The contraindications to anesthesia in the presence of acidosis, thus tissue anoxia, and dehydration apply in proportion to the retention.

A comprehensive understanding of water and electrolyte balance, dehydration, acidosis or alkalosis, and finally nitrogen balance should always allow you to make a reasonably accurate evaluation of the type and duration of any anesthesia, as well as of the hazard involved.

Urinary findings were a great deal more important 20 or more years ago; then blood chemistry and the physiology thus displayed were little understood by the average surgeon. By much the same token, greater emphasis has been placed upon urinary findings until very recently; they are better known by your group and by many surgeons. However, urinary findings alone have much less significance and merely point the way to further study.

The specific gravity of a single specimen is almost without value, though the 24 hour specimen does have value. Unfortunately this is rarely reported in surgical cases. Persistently low specific gravity findings indicate a very low renal reserve, and as such are of serious import to prolonged anesthesia of any type, more especially of those types that increase acidosis. Correlated blood chemistry findings either accentuate or mitigate the above statement. High specific gravity findings are present in diabetes (sugar being the cause), acute nephritis due to the presence of blood, and in advanced dehydration. The hazards of anesthesia are too apparent for further discussion.

Albumin above two plus contraindicates much surgery unless it is drastically urgent; with findings below that figure special precautions should be taken. Avertin should not be used. Ether is less desirable than one of the gas agents, especially cyclopropane with which a high oxygen level can be maintained.

Sugar in the urine is an absolute contraindication to anesthesia until the blood sugar has been determined. If this reveals the patient to be a true diabetic, and not subject to transitory glycosuria, every attempt to control the condition compatible with the emergency should be undertaken before anesthesia is given. If pos-

CALENDAR OF COMING EVENTS

February 11-12	Mid-South Assembly of Nurse Anesthetists and Tennessee State Association of Nurse Anesthetists, Hotel Peabody, Memphis
February 14	Wisconsin State Association of Nurse Anesthetists, Luther Hospital, Eau Claire
February 21	Michigan State Association of Nurse Anesthetists, Book Cadillac Hotel, Detroit
March 4-6	Annual Meeting, Texas Association of Nurse Anesthetists, Dallas
March 8-12	Third Institute for Nurse Anesthetists, San Francisco—Oakland—Berkeley, California
March 15-17	New England Assembly of Nurse Anesthetists, Boston
April 7-8	Annual Meeting, Ohio State Association of Nurse Anesthetists, Columbus
April 19-22	Western States Assembly of Nurse Anesthetists, Los Angeles
April 22-24	Southeastern Assembly of Nurse Anesthetists, Hotel Buena Vista, Biloxi, Miss.
April 28-29	Annual Meeting, Pennsylvania State Association of Nurse Anesthetists, Bellevue Stratford Hotel, Philadelphia
May 3-5	Tri-State Assembly of Nurse Anesthetists, Chicago
May 11-12	Fourteenth Annual Meeting, New York State Association of Nurse Anesthetists, Hotel New Yorker, New York City
May 15	Annual Meeting, Michigan State Association of Nurse Anesthetists, Mt. Carmel Mercy Hospital, Detroit
September 20-23	ANNUAL MEETING, AMERICAN ASSOCIATION OF NURSE ANESTHETISTS, Ritz-Carlton Hotel, Atlantic City

sible, these patients should be operated upon under spinal anesthesia, ice anesthesia, or regional block anesthesia. All inhalation anesthetics are dangerous, mortality and morbidity figures being much higher than for normal risks and some higher than for the aforementioned types of anesthesia.

Pus and casts in the urine call for further determination of kidney reserve, i.e., nonprotein nitrogen determinations. Of themselves, they do not contraindicate surgery, even of major proportions. Epithelial cells in the urine virtually have no importance as related to anesthesia.

Acetone and diacetic acid, without sugar especially, indicate acidosis and usually fairly marked dehydration. Unless the emergency is acute, preliminary fluids should be given to the patient. For milder grades of acidosis, a carbon dioxide-combining power of 40, the use of Ringer's lactate solution is to be preferred. For more severe grades, with a combining power under 30, sixth molar sodium racemic lactate solution is to be preferred. The anesthesia of choice would be spinal, regional block, or cyclopropane-helium-oxygen mixtures with curare for relaxation.

Further urinary tests are done. Time will not admit of their discussion, nor do the findings appear with frequency on hospital charts in the average general hospital. You will note that the acidity or alkalinity of the urine has not been mentioned. Because of the alkaline tide that always follows eating, because the time the specimen has been procured is not included, and because too few hospitals report this finding in hydrogen ion concentration, the acid or alkaline status of the urine, as reported, is of little value.

NOTES

ANESTHETIC CONVULSIONS: A REPORT OF THREE CASES HITHERTO UNPUBLISHED.—CASE 1.—A well developed man, aged 38, was admitted to the hospital for an operation for acute appendicitis. For one day he had had generalized abdominal pain. This localized in the right lower abdominal quadrant and was accompanied by vomiting on the day of operation. In addition to the signs of acute appendicitis, the physical examination revealed a red throat and red and enlarged tonsils.

For preoperative medication he was given a hypodermic of morphine, gr. 1/6, and atropine, gr. 1/150. The anesthetic was nitrous oxide-oxygen-ether with the use of a circle filter.

The operation and the anesthesia proceeded uneventfully for 25 minutes. Then a mild convulsive seizure started in his shoulders, in five minutes involved his arms and hands, and in another three minutes involved his feet. The pupillary reflex was active. He began to grunt on expiration, and his abdomen became "tight." The addition of more ether to the circuit after the first movement was without effect. (His appendix was found to have ruptured.) Three minutes later there was a sudden accumulation of mucus in his throat, and his lower eyelids started to twitch. The anesthetic was immediately discontinued, and oxygen only was given. By this time, very severe convulsive movements, lasting approximately five seconds, and recurring every one or two seconds, involved his whole body. The mucus was suctioned from his throat, and 1 Gm. evipal was administered intravenously eight minutes after the first twitching of the eyelids and two minutes after the onset of severe convulsions. In two minutes the convulsions had stopped, and the patient was quiet. His pulse rate was 128. Ten minutes later his throat was clear, and his respirations were quiet, but his pulse was bounding at the rate of 160 per minute. Abdominal closure was completed. The patient was returned to bed and given oxygen continuously for eight hours.

He had completely reacted and was oriented in four hours and had no nausea or emesis after six hours. For the first few postoperative days, his urine showed 2 plus albumin and a few hyaline casts. Recovery was uneventful.

CASE 2.—A well developed, well nourished man, aged 31, was admitted with a diagnosis of partial intestinal obstruction. He had had sudden, severe, generalized abdominal pain with vomiting five days previously. There was some remission of pain the next two days, but nausea continued. The day before hospitalization, pain had developed in the back on the right side.

Morphine, gr. 1/6, and atropine, gr. 1/150, was given hypodermically one and one-half hours before anesthesia. The anesthetic was nitrous oxide-oxygen-ether with the use of a circle filter. The patient's ab-

dominal muscles were very difficult to relax, and a large amount of ether was required.

Acute hemorrhagic cholecystitis was found at operation, and the gallbladder was drained. After one hour and twenty-four minutes, the peritoneum was closed and the administration of the anesthetic discontinued. Two minutes later, the patient's chin began to twitch. In one minute this had progressed to convulsive movements of the entire body, particularly severe in the neck and shoulders. Two minutes later 9 cc. of a 5 per cent solution of pentothal sodium was given intravenously. In two minutes the convulsions had stopped, the patient was quiet, respirations were normal, and the pulse was good. During this time, oxygen was administered continuously. A nose and throat smear was taken but showed no streptococci of a neurotropic strain.

The patient's recovery was essentially uneventful. He returned later for cholecystectomy, and the same anesthetic agents and methods were used. The anesthesia and the operation proceeded smoothly, and the second postoperative course was also uneventful.

Case 3.—A well developed, well nourished boy, aged 19, was admitted to the hospital for elective surgery with a diagnosis of chronic appendicitis. Preoperative physical examination revealed nothing of additional significance, and he had no fever. The operating room temperature on the day of the operation was 97 F. Morphine, gr. 1/6, and atropine, gr. 1/150, was given one and one-quarter hours before anesthesia. The anesthetic was nitrous oxide-oxygen-ether with the use of a circle filter. The induction phase of anesthesia was quiet. The pulse was full, but respirations were rapid. An average amount of ether was used. The pupils were moderately small throughout, the right being slightly larger. There was considerable handling of the bowel during the operation.

As soon as the peritoneum was closed, the administration of the anesthetic was stopped, and oxygen given as was the usual routine in the hospital. Two minutes later his chin and throat moved convulsively. Within another two minutes the convulsive movements involved his lips, face, and arms. No generalized body convulsions were noted. One minute later 9 cc. of a 2 per cent solution of pentothal sodium was administered intravenously. The patient became quiet immediately, and closure of the abdomen was continued. The patient's temperature at the close of the operation was 102.4 F. His pupils were large, the right being larger than the left. Oxygen was given for four hours postoperatively, as he became cyanotic without it. His temperature became normal in three and one-half hours, at which time he was conscious.

He was sullen and most uncooperative during his convalescence and refused to try to ingest liquids or solids for the first few days. He was discharged on the eighth day as cured.

Comment

Because of the great number of possible causes for anesthetic convulsions, no definite conclu-

sions can be drawn from the circumstances of their occurrence in the reported cases. However, the opinions of two groups of workers deserve mention. Mousel states: "There is a great deal of controversy in regard to the etiology of convulsions which occur during general anesthesia. Impurities in the ether, impurities in the oxygen, hypoglycemia, an overdose of atropine, cerebral anemia, alkalosis, hyperventilation, idiosyncrasy, disturbance of calcium metabolism, anoxemia, deficiency in carbon dioxide, overoxygenation and many other factors have been suggested as possible causes for this condition." With regard to convulsions occurring during ether anesthesia, Rosenow and Tovell suggested that "ether convulsions are attributable to a neurotoxin produced by some strains of streptococci in amounts insufficient to cause spasms in the absence of anesthesia but which in the course of general anesthesia suffice to incite the muscular spasms characteristic of this condition."

Harriet L. Aberg, M.A.A.N.A
Galesburg, Ill.

P. A. R.

(*Continued from page* 24)

arated over the hospital, must be considered.

An idea of how indispensable the P.A.R. has become is illustrated by a statement taken from the report on its use in 1944.[1] "In 1944 the room was closed for the entire month of April when it was moved from one building to another and the superintendent of the hospital wished to see what the result would be if the room were closed. The response from the nurses and others was immediate and one supervisor said she would rather resign than carry on without this facility. The superintendent considers the P.A.R. an excellent arrangement." At the present, when nursing service is limited by the shortage of nurses, the P.A.R. has solved one of the problems by arranging for the care of patients during the critical post-anesthesia period in such a manner that one nurse does the work which usually requires the services of three nurses.

1. Lundy, J. S.; Tuohy, E. B.; Adams, R. C.; Mousel, L. H., and Seldon T. H.: Annual report for 1944 of the Section on Anesthesiology: Including data and remarks concerning blood transfusion and the use of blood substitutes. I. Proc. Staff Meet., Mayo Clin. **20**: 292-302, Aug. 22, 1945.

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5. Lundy, J. S.; Tuohy, E. B.; Adams, R. C.; Mousel, L. H., and Seldon, T. H.: Annual report for 1943 of the Section on Anesthesiology: Including data and remarks concerning blood transfusion and the use of blood substitutes. I. Proc. Staff Meet., Mayo Clin. **19**: 408-418, Aug. 9, 1944.

6. Lundy, J. S.; Tuohy, E. B.; Adams, R. C.; Mousel, L. H., and Seldon, T. H.: Annual report for 1945 of the Section on Anesthesiology: Including data and remarks concerning blood transfusion and the use of blood substitutes. I. Proc. Staff Meet., Mayo Clin. **21**: 301-312, Aug. 7, 1946.

7. Lundy, J. S.; Tuohy, E. B.; Adams, R. C.; Mousel, L. H.; Seldon, T. H., and Pender, J. W.: Annual report for 1946 of the Section on Anesthesiology: Including data and remarks concerning blood transfusion and the use of blood substitutes. I. Proc. Staff Meet., Mayo Clin. **22**: 357-368, Aug. 20, 1947.

THE NEWS

SAN FRANCISCO—OAKLAND INSTITUTE

The Third Institute for Nurse Anesthetists will be held in San Francisco—Oakland, California, Mar. 8-12.

The registration fee is $25 and is to be paid at the time of making application. Application forms and further information may be secured from Dr. Hugo Hullerman, American Hospital Association, 18 E. Division St., Chicago 10, Ill. The enrolment is limited, so if you wish to attend, write for your application at once. Hotel reservations will be made by the Institute Committee, and you will be advised of the name of your hotel.

PROGRAM

Monday

Morning: **Registration and Greetings**

Applied Physiology of Respiration

There will be a brief review of the anatomy of these organs with consideration of the mechanics of respiration and the normal physiology, with emphasis on biochemistry. The determination of pulmonary volumina and the utilization of such determinations in the recognition of pulmonary abnormalities of interest to the anesthetist will be stressed.

Hypoxia

Causes of hypoxia will be studied as well as manifestations, damaging effects on the various systems, and treatment.

Afternoon: **Pharmacologic Effect of Anesthetic Drugs on the Respiratory Function**

Also included will be the physiologic changes in the character of respirations produced by the anesthetic drugs in all stages of anesthesia and how to treat these changes effectively. Local and spinal anesthetics, ether, vinethene and chloroform, cyclopropane, nitrous oxide and ethylene, intravenous sodium pentothal, and avertin will be discussed.

Social Hour

Tuesday

Morning: **Clinics at Various Hospitals** — 7 to 10:30 A.M.

The Art of Intratracheal Anesthesia

Review of the anatomy of the mouth and throat; method of induction of anesthesia; proper stage for intubation; technic for introducing the intratracheal catheter by the direct and indirect methods. Emphasis will be placed on safeguards to be taken before, during, and after intubation.

Afternoon: **Pharmacologic Effect of Medicaments on Respiratory Mechanism with Consideration Given to the Uses and Abuses of These Drugs**

Parasympathetic drugs, analeptic drugs, sympathomimetic drugs, curare

Wednesday

Morning: **Clinics at Various Hospitals**
Afternoon: Open
Evening: **"Information Please"**

Thursday

Morning: **Clinics at Various Hospitals**
Dental Anesthesia
Technics of administering the various anesthetic agents will be discussed. Pre- and postanesthesia care will be outlined.

Afternoon: **Causes and Treatment of Apnea and Respiratory Depression in Submersion, Carbon Monoxide Poisoning, Smoke Suffocation, Electric Shock, Heart Failure, etc.**

Evening: **How the Respiratory Mechanism and Oxygen Intake and Distribution Are Affected by Pneumonia, Asthma, Tuberculosis, and Cardiac Failure.**

Friday

Morning: **Clinics at Various Hospitals**

Afternoon: **Psychology as Applied to Anesthesia**
How Do You Recommend a Department of Gas Therapy Should Be Organized in a Small and Large Hospital?
Students are encouraged to contribute information on this topic.

Dinner and Presentation of Certificates

Address—"Making Yourself Felt in Your Hospital and Community"

Institute Committee

Dr. Hugo Hullerman, A.H.A.
Esther Myers Stephenson, Chairman, A.A.N.A.
Ann Priester
Opal Schram
Eletta Engum Silver
Sister Seraphia

FROM THE STATES

The **Arkansas** Association of Nurse Anesthetists held its seventh annual meeting jointly with the Arkansas State Nurses Association, Oct. 13, 1947, at Fort Smith, Ark. Officers elected were Alfreda Crantz, president; Dessie M. Cox, 1st vice president; Marie Walsh, secretary-treasurer.

The anesthesia record approved by the A.A.N.A. was adopted for use by the **Colorado** Association of Nurse Anesthetists for hospitals where members serve. Colorado officers for 1948 are Margaret Kramer, president; Venus Wagner, 1st vice president; Marie N. Bader, 2nd vice president; Julia Kassanchuk, secretary; Lelia Mullen, trustee. At a recent meeting, a table of "pet" anesthesia equipment was set up, and ideas were exchanged about the use of various gadgets now on the market.

Alfreda E. Crantz, President
Arkansas Association of
Nurse Anesthetists

Margaret Kramer, President
Colorado Association of
Nurse Anesthetists

Officers of the **Illinois** Association of Nurse Anesthetists for 1948 are Opal Schram, president; Corinne Millen, 1st vice president; Matilda Welinske, 2nd vice president; June Winquist, secretary; Exire O'Day, treasurer; Irene Gallandt, historian; Mae Cameron, Mary DuBusker, Julia Baines, trustees.

Officers of the **Maryland** State Association of Nurse Anesthetists for 1948 are Olive Berger, president; Mary J. O'Brien, vice president; Margaret Kenny, secretary; Doris E. O'Mailey, treasurer; Mary T. Kavanagh, trustee.

On a committee of **Michigan** anesthetists meeting with the Michigan Nursing Center Association by invitation are E. Louise Ilgenfritz, Lillian Baird, and Ione Wessinger. At the state association's tenth anniversary meeting held Nov. 8, 1947, at the Book Cadillac Hotel in Detroit, a report of the annual meeting of the A.A.N.A. was given by E. Louise Ilgenfritz with discussion by Mabel Courtney. A paper on "Anesthesia for Chest Surgery" was presented by Lenore Gribble of Henry Ford Hospital. An insurance representative was present to discuss an annuity plan.

The **Minnesota** Association of Nurse Anesthetists met in Rochester on Oct. 26. After a turkey dinner at the Kahler Hotel as guests of the Mayo Foundation, the members met in the Medical Science Building. Dr. John S. Lundy discussed some of the newer developments in anesthesia. Dr. Charles W. Mayo then gave an account of his European journey and introduced Mr. C. Naunton Morgan, a surgeon from London, and Dr. Knud Jansen and Dr. Torben Knudtzon both of Copenhagen. Dr. John Paulson of the Mayo Clinic staff spoke on curare, and Miss Sein Bwent, one of Dr. Seagrave's nurses, told of her experiences with anesthesia during the Burma campaign.

The eighth annual meeting of the **Mississippi** State Association of Nurse Anesthetists was held on Oct. 17-18 at the Robert E. Lee Hotel in Jackson in conjunction with the Mississippi State Hospital Association convention. The principal speaker was Dr. John Adriani. Pentothal and curare were discussed by Billie Caraway of the Georgia Baptist Hospital in Atlanta, and intra-

tracheal intubation was demonstrated by Evelyn Allen of the Baptist Hospital in Jackson. Officers for 1948 are Georgia Regan, president; Alberta Shurley, vice president; Lucille Lovett, secretary; Willie Bruce Maroon, treasurer; Sr. M. Crucifix, trustee.

At the **New York** State Association of Nurse Anesthetists, holding its fourteenth annual meeting at the Hotel New Yorker in New York, May 11-12, the morning sessions will be devoted to clinics and the afternoon sessions to scientific meetings. Requests for additional information about the meeting should be addressed to Mildred Cook, Coney Island Hospital, Brooklyn 23, N.Y.

To celebrate her twenty-fifth year of service at Children's Hospital in Cincinnati, **Ohio,** Mrs. Mary A. Wildermuth Ware was honored on July 19, 1947, at a tea attended by the nursing, surgical, and medical staff members. Mrs. Ware was presented with a watch and a silver cream and sugar service in appreciation for her faithful service. She was the first nurse in charge of anesthesia in the hospital and a pioneer in the x-ray department. She was also the first president of the Ohio State Association of Nurse Anesthetists.

The **Texas** Association of Nurse Anesthetists will hold its annual meeting in Dallas, Mar. 4-6. Subjects and speakers on the program include:

"Anesthesia for Blue Babies"
Pauline Hensley, M.A.A.N.A.
Baylor University School of Anesthesia

"Research in Oxygen"
Allie Fruge, M.A.A.N.A.
Galveston

"Electrolyte and Fluid Balance"
Dr. Tim Green
Dallas

"Histaminic Action of Curare"
Dr. Earl Wier, Director of Anesthesia
Baylor University

"Anesthesia for Neurosurgery"
Dr. Cassie Patterson
Dallas

"Physiology of Respiration"
Dr. Carl Moyer
Southwestern University

"Analgesia and Anesthesia for Obstetrics"
Dr. Wm. Mengert
Southwestern University

At the tenth annual meeting of the **Wisconsin** Association of Nurse Anesthetists, held at the St. Francis School of Nursing, LaCross, Nov. 8, 1947, the following officers were elected: Esther E. Edwards, president; Mary Donovan, 1st vice president; Mabel Berg, 2nd vice president; Ruth Heideman, secretary; Eletta Engum Silver, Leone Thielen, Catherine Cameron, and Alice Anderson, trustees. Rosella Crotty invited the association to hold the February meeting at the Luther Hospital in Eau Claire. Dr. Edward Levine, director of the chest service at Michael Reese Hospital in Chicago, gave a talk on inhalation therapy, and Sr. Mary Hyacinth, St. Cloud Hospital, St. Cloud, Minn., presented a paper on shock.

ASSEMBLIES

The **Southeastern** Assembly of Nurse Anesthetists will convene at the Hotel Buena Vista, Biloxi, Miss., Apr. 22-24. Anne Beddow is chairman of the Program Committee. Officers of the assembly are Evelyn Allen, president; Billie Caraway, vice president; Mrs. Boykin Davis, treasurer.

(*Continued on page* 66)

ABSTRACTS

Beecher, Henry K.: The specialty of anesthesia. Ann. Surg. **126**: 486-499, Oct., 1947.

"In the first place, one must admit that a stigma is attached to anesthesia . . . [and] . . . will continue to be present until anesthesia can attract its share of able men. . . . Anesthesia is not rich in technics, nowhere nearly as rich as surgery is. . . . To insist that as much time is necessary for the technical training of the anesthetist as of the surgeon is to take an indefensible position. . . . Anesthesia was developed in the clinic and has been nourished chiefly by clinicians. . . . The almost complete mystery surrounding the mechanism of the anesthesia process itself and the invulnerability of the mystery to such attacks as have been made upon it, have done much to discourage investigation in this complex field. . . . Anesthetists . . . have reached out and taken . . . agents from the chemist and applied them hit or miss in anesthesia, disregarding the information available from the physiologist and pharmacologist and pathologist concerning these same substances, at the expense of lives. . . . To live a vigorous life a specialty must have not only those who can apply the developments of others but also those who can create new ones. As long as its intellectual life is parasitic, the specialty will never develop satisfactorily. . . . The technical demands of surgery are so great that the successful surgeon will not often have adequate time to carry on investigation. It is one of the great advantages of the field of anesthesia that the anesthetist can have such opportunity. . . . Too often the anesthetist becomes so preoccupied with the technics and tools of his field that he loses interest in medicine and whatever knowledge he had of it. . . . The very ease with which the simplest forms of clinical anesthesia can be administered has until recent years allowed almost the entire specialty in this country to rest in the hands of nurses, or physicians whose equipment is mainly limited to the technical, individuals who could not be expected to make advances. This statement is in no way intended to reflect upon their faithful and in many cases competent services in allaying pain; but so far as I know, no nurse has ever made a single contribution to anesthesia. In the hands of nurses, and in the hands of many physicians as well, anesthesia is a craft. . . . Until anesthesia is taught in terms of principles, it can hardly rise above the status of a craft. . . . It is neither necessary nor desirable that all residents in anesthesia carry on so-called research. It is not only desirable but necessary that those who are being fitted for an academic career do so. . . . Nurses have not contributed and cannot be expected to contribute to the development of anesthesia. (They work at a purely technical level; but so also do physicians who limit their interests to technics.) . . . The technics of anesthesia

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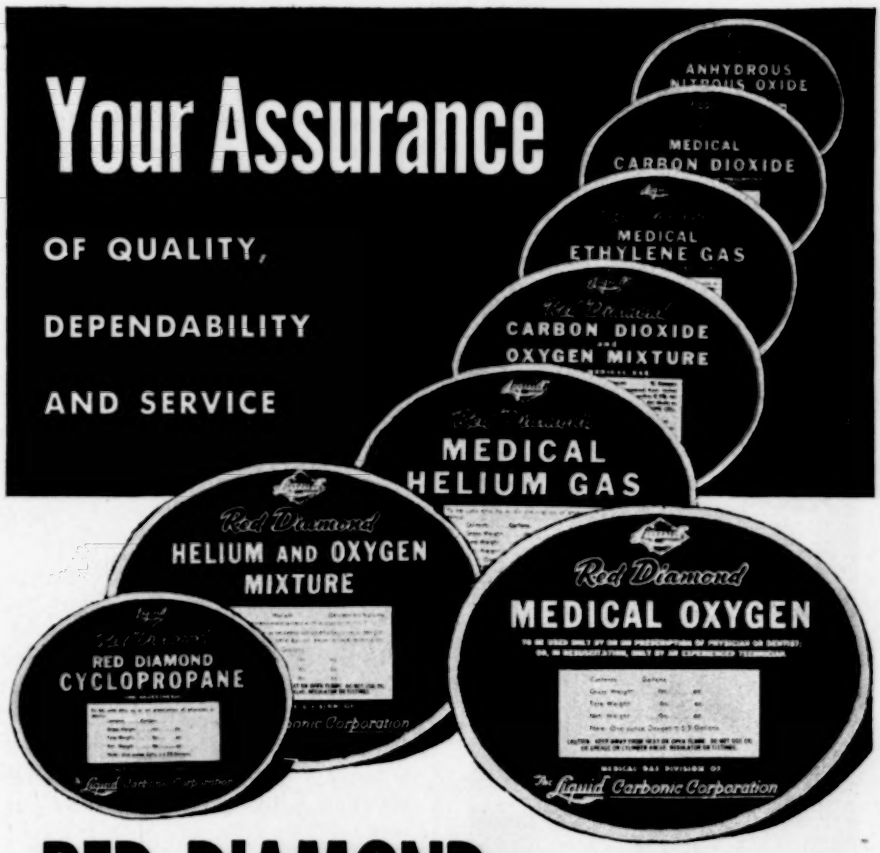
require an apprenticeship type of training. Little is to be learned from observation alone; learning here, as in surgery, comes from doing. Therefore, it is necessary to provide an abundance of clinical material for use under guidance. Therefore, also, we struggle to avoid over-expansion of our training program, so that plenty of clinical material will be available for each man accepted for training. . . . Anesthesia technics must have a surer foundation than can be obtained in the clinic alone. It is important that they be taught in terms of principles first and details second. . . . The costs of medical care are so great that anything that might cause them to rise (as, for example, the complete elimination of nurse anesthetists) must be examined with scrupulous care. . . . Anesthesia is as closely related to surgery as asepsis or hemostasis. Separation of anesthesia and surgery, except for administrative, teaching, and developmental purposes, is unwise and not to the patient's good. . . . There is a great shortage now of anesthetists. In future years this may be considerably less acute than now and departments organized on the basis of free help may, in the years to come, be in trouble, it being harder then than now to get good men good jobs with the result that fewer men will seek anesthesia training then than now. . . ."

Lundy, John S.: Recent advances in anesthesia. Mod. Hosp. **69**: 90-94, Nov., 1947.

"Inasmuch as an anesthetist is a part of the surgical team, any improvement in the effort of the anesthetist ultimately should be reflected in improvement of the effort of the whole team. However, results are not entirely limited to the work done in the operating room but can be traced on into the postoperative period and ultimately they produce in varying degrees some changes in the operation of the hospital itself. . . . There are some who feel that the older technic of administering a high flow of gases with or without ether had much to recommend it. . . . As a matter of fact, in the hands of most anesthetists the use of the so-called gas machine has been so changed because of the soda lime absorber that the procedure today actually consists of the induction of anesthesia with nitrous oxide and oxygen followed by a period in which nitrous oxide, oxygen and ether are given; then anesthesia is maintained almost entirely with ether and oxygen. The results are not much different from those which follow the use of ether by the open drop method. The patient becomes saturated with ether during the operation, he has a prolonged period of recovery of consciousness and he has a prolongation of inebriation, with nausea, vomiting and prostration that is undesirable. This affects the surgeon and his assistants, particularly insofar as water balance is concerned, and a variety of possible complications, such as acute dilatation of the stomach, postoperative pulmonary complications and postoperative damage to the kidneys and liver, may occur. . . . Morbidity as a result of large doses



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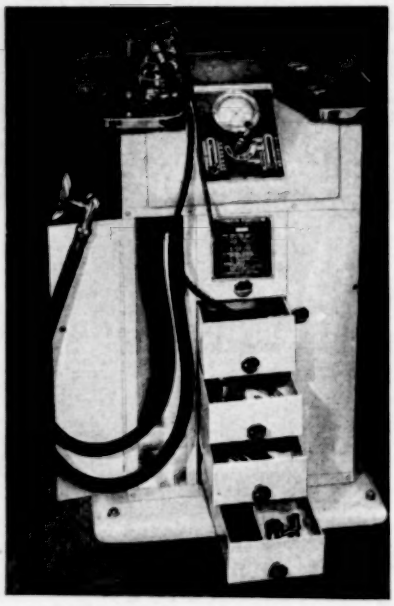

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of ether usually leads to mortality in a certain percentage of cases. . . . The fault is not that of the original plan but rather is due to the fact that the anesthetist tends to produce profound anesthesia and relaxation with large doses of ether, many times without realization of the quantity or concentration of it in the respired atmosphere within the bag. . . . Headache which may follow lumbar puncture and which is not infrequently associated with spinal anesthesia might be avoided by use of inhalation anesthesia plus curare . . ."

NEWS

(*Continued from page* 61)

Officers for the **Tri-State** Assembly of Nurse Anesthetists for 1948 are Julia Baines, president; Pauline Henry, vice president; Burlie Eggleston, secretary-treasurer. The assembly will meet in Chicago, May 3-5.

DEATHS

Dessa C. Hale, a member of the Ohio Association of Nurse Anesthetists, died in Wilmington, Ohio, on Sept. 18, 1947. She received her training in nursing at the St. Louis School of Nursing and graduated from the Lakeside School of Anesthesia in Cleveland.

Sister M. Christina, a member of the Washington State Association of Nurse Anesthetists and formerly an anesthetist at the Sacred Heart Hospital, Spokane, died on Dec. 28, 1947. She was a graduate of St. Vincent's School of Nursing in Portland and had training in anesthesia at the Sacred Heart Hospital in Spokane.

BOOK REVIEWS

ESSENTIALS OF GENERAL ANESTHESIA. By R. R. Macintosh, M.A., M.D., F.R.C.S., D.A., Nuffield Professor of Anaesthetics, University of Oxford; and Freda B. Bannister, M.A., M.D., D.A., First Assistant, Nuffield Department of Anaesthetics, University of Oxford. Cloth. 341 pages, 239 illustrations. Springfield, Ill.: Charles C Thomas, Publisher, 1945.

This third edition of the book, which originally was printed in 1940, has not been changed greatly since the first edition. The book was written as a supplement to undergraduate lectures and concerns the principles underlying the administration of anesthetics. Chapters include brief discussions of the history and theories of anesthesia, respiration, cyanosis, signs of anesthesia, and signs of nitrous oxide anesthesia. Indications for local or general anesthesia, the choice of general anesthetic, a long discussion of preanesthetic medication, and preparation for operation are among many subjects considered. The anesthetic agents, special uses, methods, apparatus, complications, and emergencies are considered. Legal aspects of anesthesia, explanation of cylinder valves and reducing valves, and a newly added chapter on the Oxford vaporizer are among the many phases of the subject included in the book.

Each chapter is followed by a list of references pertaining to the subject of the chapter. Two hundred and thirty-nine sketches, some in color, and pictures illustrate the text. An index of personal names which were used in the text and a subject index complete the book.

LOCAL ANAESTHESIA: BRACHIAL PLEXUS. By R. R. Macintosh, M.A., M.D., F.R.C.S., D.A., Nuffield Professor of Anaesthetics, University of Oxford; and William W. Mushin, M.B., B.S., D.A., First Assistant, Nuffield Department of Anaesthetics, University of Oxford. Cloth. 56 pages, 33 illustrations. Springfield, Ill.: Charles C Thomas, Publisher.

The authors believe that the pictorial presentation of technics of local anesthesia has many of the advantages of watching masters of the art. For those who cannot be eye-witnesses of such technics, this book has been prepared. By limiting the subject exclusively to one technic, the authors have succeeded in presenting a complete and concise description of that technic in a small, neatly bound book of 56 pages. Short chapters are devoted to premedication, instruments, solutions, and position for brachial plexus block. Actual application of the method from skin wheal to production of analgesia is discussed. The stellate ganglion, Horner's syndrome, and complications of the method are also considered. Each main section of the book has a list of references following the text. A short list of biographical notes completes the book. Thirty-three drawings and pictures, some of them emphasized with colors, are integrated with the text.

Law of Hospital, Physician and Patient. By Emanuel Hayt, LL. B., Lecturer in Hospital Administration, Columbia University in the City of New York; and Lillian R. Hayt, M.A., J.D., of the New York Bar. Cloth. 647 pages. New York: Hospital Textbook Company, 1947.

The fact that four "forewords" precede the text of this book is some indication of the interest with which it has been received. Although there are parts (if not all) of other chapters which will be of value to anesthetists, undoubtedly chapter XI will arouse the most immediate interest. A brief survey of history, appliances, methods, agents, and records precedes the legal aspects of anesthesia. The need for preanesthetic examination, authorization for the use of anesthetics, administration by nurses, liability, responsiblity, fatalities, overdosage, and explosions are some of the subjects which are considered. Footnotes are used for references. In addition to the Table of Contents there is an outline of the contents of each chapter. A table of abbreviations facilitates the reading of the text. The chapters on records will be interesting to anesthetists, as will many other phases of the subject. A glossary, index of cases, and an index of topics make the contents of the book readily available for reference.

White Caps: The Story of Nursing. By Victor Robinson, M.D., Professor of History of Medicine, Temple University School of Medicine, Philadelphia; Lecturer on History of Nursing, Temple University School of Nursing. Cloth. 425 pages, 25 illustrations. Philadelphia and New York; J. B. Lippincott Company, 1946. $3.75.

The reader who is familiar with previous works of Victor Robinson will need nothing more than mention of his name to arouse interest in this book. The author's dedication to the nurse, which precedes the actual history, will inspire the nurse who often forgets the high ideals of her profession. The book is written in narrative style. The story of nurses of antiquity, of Greece, during the Middle Ages, and through the eighteenth century occupies a relatively small part of the book. The story of Florence Nightingale is presented as a prelude to the story of the development of the trained nurse.

The background of American nursing and nurses in the American Revolution, in the War of 1812, and in the Civil War is part of this record. Individuals such as Mother Bickerdyke, Mary Safford, and Clara Barton receive full credit for their nursing activities. The first schools of nursing are listed, and the book contains brief sketches of notable nurses of America. The stories of Edith Cavell and of the Medical Sisters of the Soviet Union are each presented, as well as the stories of American nurses in the world wars. A survey and statistics pertaining to nurses and nursing complete the text.

A chronological outline entitled "The March of the Nurse" contains much useful information in concise form. An alphabetical outline of bibliographical notes follows the chronological table.

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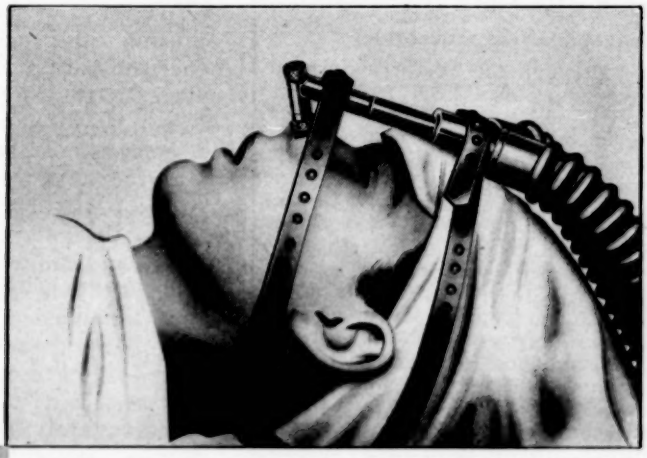

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*Flagg, P. J.: The fenestration operation: major hazard — the anesthetic, (editorial), Am. J. Surg., 72: 497-499 (Oct.) 1946

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RESOLUTION ON NURSE ANESTHETISTS

At the meeting of the Southern Surgical Association, in Hollywood, Fla., Dec. 9-11, 1947, the following resolution was passed unanimously:

"Although the Southern Surgical Association has been and always will be extremely interested in the advancement of all medical sciences, and particularly in anesthesia because of complete dependence on safe anesthesia for the safe performance of a surgical procedure, it, the Southern Surgical Association, heartily disapproves of the publicity given by certain newspapers and popular lay magazines to the statements sponsored by a group of anesthesiologists who are seeking to discredit the well trained nurse anesthetist and to compel surgeons to operate only if anesthetics are administered by physician anesthetists.

"This attempt to persuade the public that there is grave danger in a surgical operation if the anesthetist is not a certified medical specialist is already decreasing the number of efficient well trained nurse anesthetists and forcing surgeons to perform recently developed complicated operations with anesthetics administered by young hospital interns or general practitioners, neither of whom have special training or experience in the administration of an anesthetic."

BODY FLUIDS

(*Continued from page* 48)

latory bed and the extravascular tissue spaces. This is accomplished through the colloid osmotic pressure exerted, chiefly by the albumin fraction, in the blood stream. Shock, hemorrhage, and rapid protein loss, as seen in extensive burns and in liver damage, may serve to depress the total plasma protein values. No significant change is attributable to the effects of anesthetic agents per se. Decreases in plasma protein concentration are often noted postoperatively, more frequently in the poorly nourished than in the nutritionally normal individual.[4,6]

In the correction of aberrations of the extracellular and plasma fluid mass in the anesthetized patient, as in any disease state, a thorough knowledge of the physiologic mechanisms is necessary. To this one must add the available data pertinent to the particular disease state for which the patient undergoes surgery and anesthesia. Considerable study is often required before the needed information can be obtained and treatment directed to correct metabolic, electrolyte, and fluid deficiencies. Unfortunately this study is not always possible. Occasionally, the minimum of laboratory data is required.[4] In every patient, however, a careful history, physical examination, and close observation before, during, and after an anesthetic can do much toward adding to his safety. Much has been written on the use of drugs, blood, plasma, and intravenous fluids, all of which are of inestimable value when properly used. None, however, can serve as a substitute for the thoughtful co-operation of the anesthetist, surgeon, and internist, who may reduce the need for these procedures by adequate analysis of the patient's state and anticipation of his requirements.

4. Abbott, loc. cit.
6. Thornton, loc. cit.

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WANTED: One nurse anesthetist. Salary open. Complete maintenance. Desirable working conditions. Write to: Dr. Allen Silverton, Silver Cross Hospital, Joliet, Ill.

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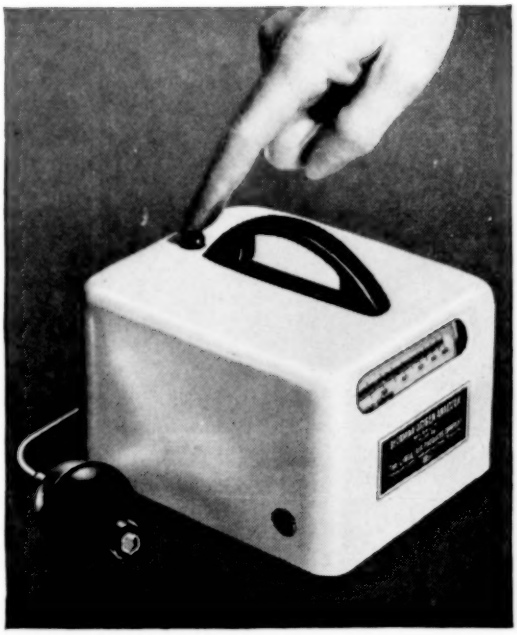

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